

COST RECOVERY AND FINANCIAL
MANAGEMENT IMPROVEMENT

Final Report for Machala, Ecuador

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WASH Field Report No. 422
July 1993

**WATER AND
SANITATION for
HEALTH
PROJECT**

Sponsored by the U.S. Agency for International Development
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COST RECOVERY AND FINANCIAL MANAGEMENT IMPROVEMENT

Final Report for Machala, Ecuador

Prepared for the USAID Mission in Quito, Ecuador
U.S. Agency for International Development
under WASH Task No. 462

by

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RELATED WASH REPORTS

Summary Report of the Integrated Cholera Control and Prevention Program for Machala, Ecuador. September 1993. Field Report No. 427. Prepared by John Paul Chudy. (Available in English Only)

Prefeasibility Study for Water Supply, Treatment, and Distribution for Machala, Ecuador. July 1993. Field Report No. 400. Prepared by Elio F. Amiella, P.E. (Available in English and Spanish)

Machala Latrine Design Workshop. May 1993 Trip Report. Prepared by Mercedes Torres Barriero, Enrique Gil-Bellorin, and John Gavin. (Available in Spanish only)

Machala Cholera Control and Prevention Workshop. April 1993. Trip Report. Prepared by Mercedes Torres Barriero, Enrique Gil-Bellorin, and Jose Ignacio Mata. (Available in Spanish only)

Water Quality Assessment in Ecuador. February 1993. Field Report No. 390. Prepared by John Paul Chudy, Elio F. Amiella, and Enrique Gil-Bellorin. (Available in English and Spanish)

Machala Integrated Cholera and Prevention Program Preparation Visit. March 22-26, 1993. Trip Report.

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ACRONYMS

CGE	Contraloría General del Estado (Government Auditing Office)
CONADE	Consejo Nacional de Desarrollo (National Development Board)
FIM	Fondo de Inversiones Municipales (Municipal Investment Fund)
FODESEC	Fondo de Desarrollo Seccional (Sectional Development Fund)
FONDORO	Fondo para el Desarrollo de la Provincia de El Oro (El Oro Province Development Fund)
IEOS	Instituto Ecuatoriano de Obras Sanitarias (Ecuadorean Sanitary Works Institute)
PDM	Programa de Desarrollo Municipal e Infraestructura Urbana (Municipal Development and Urban Infrastructure Program)
RHUDO	Regional Housing and Urban Development Office
USAID	Mission of the United States Agency for International Development in Ecuador
WASH	Water and Sanitation for Health Project
WHO	World Health Organization

EXECUTIVE SUMMARY

For implementation of Task No. 462, the U.S. Agency for International Development Mission to Ecuador (USAID/Ecuador) requested that the Water and Sanitation for Health Project (WASH) provide two consultants to travel to the cities of Quito and Machala in Ecuador. The consultants spent the period between June 14 and July 9, 1993 performing task No. 462, which is aimed at improving cost recovery and financial management in the Water and Sanitation Departments of the municipality of Machala.

The consultants wish to express their appreciation for the assistance provided to them by the authorities of the municipality of Machala, and especially by Ing. Wilmer Encalada, Director of Planning and Projects for the municipality.

The chapters dealing with each of the topics covered by the consultancy, as well as the annexes, contain detailed explanations of the most salient observations as well as appropriate recommendations.

Below is a summary of the most salient findings detailed by the consultants, together with conclusions and recommendations.

1. Salient Findings

1.1. Water Distribution and Sewerage Systems

- 1.1.1 Water distribution and sewerage systems, and particularly networks, are in a deplorable state.
- 1.1.2 Water service is deficient both in terms of quality as well as in terms of quantity.
- 1.1.3 No major improvement or expansion projects have been undertaken for more than 10 years.
- 1.1.4 The demands of the public for water and the constant pressure placed on the municipality by the public in this regard increase the likelihood of an outbreak of a major social disturbance, as has already happened in the past.
- 1.1.5 Residential water service coverage is only 43 percent of the population and there is no system in place to measure consumption.
- 1.1.6 The Regional Water Treatment Plant, which has been under construction for more than ten years, will apparently be put into

operation during the first quarter of next year as a result of a presidential commitment made on a visit on last June 25.

- 1.1.7 Sewerage service is also deficient and is made worse by the fact that Machala's geographic location places it in a difficult situation with regard to disposal of waste water, as the latter ends up in the sea, which is located at virtually the same level as the city.
- 1.1.8 The extremely critical status of the sewerage network, system is manifested especially in the rainy season, when the entire city suffers the effects of flooding, with resulting contamination. As a result of poor quality of the sewerage networks, the likelihood of contamination of safe water by waste water sources increases.
- 1.1.9 Losses of water are on the order of 60 percent, of which between 15 percent and 20 percent are attributable to clandestine users.
- 1.1.10 There are users who go to the municipality to request that they be dropped from the schedule of users because they have never had water despite the existence of a distribution network.
- 1.1.11 The staff of the Water Department and Sewerage Section lacks training.
- 1.1.12 During the second half of the current year, the distribution networks located in the downtown area of the city will be reconditioned using funds transferred from the government.
- 1.1.13 With funds provided by FONDORO and the central government, two wells will be drilled, with work scheduled to be completed in December of this year.
- 1.1.14 The prefeasibility study for the Machala integrated water system is currently being prepared.
- 1.1.15 The feasibility study and final design for the Machala sewerage system are currently being developed

1.2 Recovery of the Cost of Investments and Operations

- 1.2.1 Water service tariffs do not cover operating and maintenance costs.
- 1.2.2 The subsidy provided by the municipality for the operation and maintenance of the water system is on the order of 75 percent.
- 1.2.3 There is no legal basis for establishing rates nor an appropriate collection mechanism.

- 1.2.4 The amount charged per cubic meter is ludicrous, because where the rural systems in the province of El Oro charge S/.250 per cubic meter, Machala charges only S/.24 per cubic meter, up from its 1991 level of S/.20 following orders issued by the Mayor in 1992.
- 1.2.5 Collection of the water tariff takes place by means of an annual issuance of advice of assessment, but almost no one pays. Nor does the municipality have in place a mechanism for carrying out collection activities.
- 1.2.6 The schedule of users is not up-to-date and is kept by an employee using a manual system.
- 1.2.7 Amounts charged for water connections are not the result of any particular cost study.
- 1.2.8 No tariff is applied for sewerage service. Rather, only the initial connection is charged and this likewise is not the result of a cost study.
- 1.2.9 Likewise, neither are investment costs for network expansion in outlying neighborhoods recovered since, as with the tariffs, no collection mechanism has been established, primarily due to the negligence by municipal authorities.
- 1.2.10 The current Mayor is committed to taking all steps necessary to improve the services provided and increase cost recovery to the extent that the payment capacity of the users will permit.
- 1.2.11 As water services is much worse in newly settled neighborhoods, especially in the poorest areas and even in areas considered to be "residential", water supply occurs on the basis of tank trucks that charge S/.4,000 per cubic meter, or almost US\$2.00, while the municipality charges the tankers S/.1,000 for 7 cubic meters, or S/.143 per cubic meter.
- 1.2.12 To date the advice of assessment covering this year's water bills have not been issued.

1.3 Financial Management Methods and Procedures

- 1.3.1 The functions performed by the individual sections making up the Financial Department of the municipality cannot be classified as pertaining to "financial management", as they do not include functions aimed at identifying financial policies, planning, evaluation of results, improvement of procedures and rationalized recommendations of a general nature.

- 1.3.2 Although it is in the Appraisals and Cadaster Section that the computer system has been initially set up, it is apparent that the lack of confidence in the system has led each employee to keep his or her own parallel records on a manual basis.
- 1.3.3 The Computer Operations Section, perhaps as a result of the direct service that it is supposed to provide to the financial area and the urgency and top priority assigned to collections, was placed in the Financial Department.
- 1.3.4 Although there is a computer terminal in the Accounting Section, it is not being used; likewise, cables has been run to the Water Department, although no terminal has been installed.
- 1.3.5 Generally speaking, the plan for computerized operations is at an incipient stage, and the lack of technical support available in the municipality is apparent. The only program currently in operation is that of the Cadaster Section, which is used to collect taxes.
- 1.3.6 There is no budget unit. This function is performed by the Accounting Section, but there is a lack of an appropriate planning and budgeting system.
- 1.3.7 The accounting function complies with the demands of the Government Accounting Office. It follows government accounting standards and records transactions based on the cash method of accounting.
- 1.3.8 The accounting system is not used as a tool for cost analysis, planning or decision-making with regard to water and sewerage services.
- 1.3.9 It is not possible to obtain quickly appropriate cost information broken down by concepts or processes.
- 1.3.10 There is no apparent initiative to make "urgent" changes to the budgetary accounting system required by a municipality charged with providing a wide variety of services, such as water distribution, sewerage, etc., and which should be reflected in a cost accounting system and results analysis that would determine administrative efficiency and facilitate cost recovery.
- 1.3.11 The Accounting Section performs all of its functions manually. There is no software for this purpose and the accounting staff is reluctant to use their computer terminal because of the frequency of system crashes and the fear that they will lose data.
- 1.3.12 The Treasury Section does not prepare a cash flow or liquidity analysis that would make it possible to take appropriate action.

- 1.3.13 There does not exist an appropriate record of accounts receivable, and accordingly the portfolio is not accurate.
- 1.3.14 CONADE has not yet approved the 1993 budget since it felt that revenues had been overestimated and no supporting detail had been submitted.
- 1.3.15 The Fixed Assets in Operation account does not include the water and sewerage networks or facilities.
- 1.3.16 Generally speaking, the staff of the Financial Department shows little willingness to cooperate by providing information, an attitude that is perhaps caused by the distrust surrounding previous studies, the lack of job security and the precautions taken to avoid any "information" reaching the Government Accounting Office. With very few exceptions, the staff assume a hostile attitude with outsiders as well as in their dealings with the general public in the offices of the municipality.
- 1.3.17 The relationship between the various sections of the Financial Department apparently does not facilitate information flow, and since no management information is requested from the Accounting Section, its objectives are limited to recording data and providing information for the Control Unit.

2. Conclusions and Recommendations

- 2.1 The image of the municipality in the public eye has deteriorated as a result of its practically nonexistent performance of the past, especially as regards water distribution and sewerage services. Also contributing to this situation is the dirty and abandoned aspect presented by the interior of the building and facilities, the unfriendly attitude of its employees and the dissatisfaction of residents with other public services.
- 2.2 In order for there to be any improvement in the Water and Sanitation Departments of the municipality with regard to accounting and budget systems and financial administration in general, as well as in the implementation of appropriate cost recovery methods and procedures, it will be essential for the current structure of the Financial Department to be modified in its entirety, along with its procedures and methods, which would require a considerable amount of time and involve high levels of costs.
- 2.3 Since the current municipal administration, headed by the Mayor, is wholly committed to providing improved water and sewerage services, it is essential for it to drastically improve its current image through the creation of the Machala Municipal Water and Sewerage Enterprise.

- 2.4 Municipal authorities should take all steps and carry out all activities required to bring about the prompt and timely creation of the Municipal Water and Sewerage Enterprise. To achieve this objective, it will be necessary, among other things, to do the following:
 - 2.4.1 Draft an ordinance creating the enterprise and obtain the approval of the Municipal Council.
 - 2.4.2 Study the physical location of the enterprise, which should be housed separately from the municipal building, in order to provide a completely new image to the two services.
 - 2.4.3 Request technical assistance for designing the organizational structure, including all of its various positions, functions and responsibilities.
 - 2.4.4 Appropriate the land and obtain the resources necessary for the design and construction of the facilities.
 - 2.4.5 Request advisory assistance for implementing the proposed institutional development program described in Chapter 7.
 - 2.4.6 Visit the EMAP-Q and ETAPA-Cuenca in order to observe their organizational structures and receive training in their marketing and financial administration systems.
 - 2.4.7 Request technical assistance for designing the marketing and financial administration systems (this could be done with assistance from the personnel from the EMAP-Q that designed, developed and placed into operation the above-mentioned systems.
 - 2.4.8 Prepare both the initial budget as well as the opening balance sheet for operations.
- 2.5 In order to recapture the trust and credibility of the public, implementation of the above-listed activities should be accelerated. In conjunction with this, a contest should be drawn up, with full and open participation, for designing a logo for the enterprise.
- 2.6 Request technical assistance for conducting a study to detect, control and correct leaks and place it into operation once finished.
- 2.7 Request advisory assistance for preparing a study to determine the type of water meters to be used in Machala.
- 2.8 Institute a procedure for issuing bills for payment of water fees on a monthly basis, as the current procedure, which is performed annually, is too inefficient.
- 2.9 Conduct the appropriate studies for determining the actual costs of water connections and sewerage installation.

- 2.10 Request advisory assistance for conducting the study of water and sewerage tariffs, both before and after installation of the water meters.
- 2.11 Implement the schedule of users and networks, with regard to both water and sewerage service, and then computerize it.
- 2.12 Cull the portfolio of debit balance users and take decisive action to collect any outstanding balances.
- 2.13 It was determined that extreme poverty does not exist in Machala, as the salary level prevailing in the lower socio-economic class is above the official minimum. Rather, poverty is reflected in the lack of public services.
- 2.14 After estimating and projecting investment costs as well as the costs of operation, maintenance, administration, depreciation and block water supply for the Regional Plant, and after analyzing cost recovery mechanisms and the payment capacity of users, the following conclusions were reached:
- 2.14.1 Fifty percent of the cost of investments in meters, networks, tanks and pressure filter treatment plants could be financed, on a reimbursable credit basis, through the Banco del Estado-administered Municipal Development Program (PDM), which receives funds from IDB and World Bank loans as well as national counterpart funds through the Municipal Investment Fund (FIM). Twenty percent could be financed through nonreimbursable contributions from the Municipal Investment Fund (FIM), and the remaining 30 percent could be financed with own resources to be provided through the recovery of the cost of meters and from special improvement assessments. However, it is felt that Machala will be able to pay for the amortization of capitalized interest during the investment period only through the year 2001, and that from that time on it will require a transfer to cover such payments. If this is not possible, then interest should not be capitalized but rather should be absorbed by the FIM, with the remaining funds to be earmarked for sewerage works. In this case, the amount of the average monthly fee per benefiting user would be as follows:

a) Cost of Meters

The estimated amount to be paid by each user per installed meter, at current prices, would be S/.134,750 which, when financed over a 24-month period at an annual rate of interest of 36 percent, gives a monthly payment of S/.7,960, or US\$4.20.

b) Cost of Water System Expansion and Improvement Works

Based on an estimate that the number of properties to benefit from these works will total 60,000, the average amount to be paid by each through a special improvement assessment (in accordance with the provisions of the Law of Municipal Administration) would be S/.362,471 which, over a period of 36 months at an annual interest rate of 36 percent gives an average monthly payment for the lower class population of S/.8,250, or US\$4.34.

2.14.2 Costs of Operation, Maintenance, Administration, Depreciation and Block Water Supply

At current prices, in the year that these costs are highest as a result of the start-up of the entire new system, average monthly payment per user is S/.9,989, which would cover all costs in their entirety. For users in the lower class, an estimated consumption of 20 m³/month would be equivalent to no more than one day's minimum wage, which is currently set at S/.5,790, or US\$3.05.

To summarize, the total monthly payment required for provision of adequate water service to a lower class user at current prices would be as follows:

Meter (24 months)	S/. 8,250	US\$ 4.20
Special Improvement Assessment (36 months)	S/. 7,790	US\$ 4.34
Monthly Payment of Water Tariff	S/. 5,790	US\$ <u>3.05</u>
MONTHLY TOTAL	S/.22,000	US\$11.59

This amount represents 12.67 percent of the monthly minimum wage, or almost four days' minimum wage, an amount considered to be in accordance with the payment capacity of the lower class population of Machala.

The monthly payment of S/.22,000 is equivalent to purchasing the following articles, which are not basic staples and are considered to be harmful to health:

6 beers at S/.1,000	=	S/. 6,000
5 packs of cigarettes at S/.1,700	=	S/. 8,500
3 liters of Coca-Cola at S/.2,500	=	S/. <u>7,500</u>
		S/.22,000

- 2.15 Adopt a financial scheme as detailed in Chapter 6.
- 2.16 In order for the municipality of Machala to improve its water distribution and sewerage services, it should comply with the terms of the program and schedule of activities described on the following pages of this summary.

**PROGRAMMING AND SCHEDULE OF ACTIVITIES
AIMED AT IMPROVING WATER DISTRIBUTION
AND SEWERAGE SERVICES
IN THE MUNICIPALITY OF MACHALA**

Described below are the activities to be carried out and their implementation period, in order to achieve the objectives proposed by the Municipal Mayor with regard to the improvement of water and sewerage systems:

<u>No.</u>	<u>Activity</u>	<u>Responsible Party</u>	<u>Period</u>
1.	Preparation of the ordinance creating the municipal enterprise.	Mayor	July 93- Aug. 93
2.	Approval of the ordinance by the municipal council.	Mayor	Sep. 93- Oct. 93
3.	Appropriation of the land for construction of facilities.	Mayor	Sep. 93- Oct. 93
4.	Obtain technical assistance for designing the organizational structure, which should also include positions and functions.	Planning and Project Department	Nov. 93- Jan. 94
5.	Design the facilities for the enterprise and develop a construction plan.	Planning and Project Department	Nov. 93- June 94
6.	Obtain the resources necessary to build the facilities.	Mayor	Jan. 94- Feb. 94
7.	Obtain technical assistance to determine what types of meters to use.	Planning and Project Department	Jan. 94- Mar. 94
8.	Obtain advisory assistance for the water tariff study.	Water Department	Oct. 94- Nov. 94
9.	Obtain advisory assistance for implementing the institutional development program.	Mayor	Jan. 94- Dec. 95

<u>No.</u>	<u>Activity</u>	<u>Responsible Party</u>	<u>Period</u>
10.	Obtain technical assistance for designing and implementing the marketing and financial administration systems.	Mayor	Jan. 94- June 94
11.	Draw up the schedule of users, networks and connections	Water Department	Jan. 94- Mar. 94
12.	Cull the portfolio of debit balance users and make concerted efforts to collect amounts outstanding.	Financial Department	Mar. 94- June 94
13.	Prepare and develop the feasibility study for the water project and the ordinance establishing the special improvement assessment.	Mayor	Aug. 93- Oct. 94
14.	Start-up of operations at the enterprise.	Mayor	Aug. 94
15.	Obtain technical assistance for conducting the study to detect, control and correct leaks.	Mayor	Oct. 93- Dec. 93
16.	Conduct and apply the studies for determining the real costs of water connections	Water Department	Sep. 93- Oct. 93
17.	Conduct and apply the studies for determining the real costs of sewerage installation.	Sewerage Section	Sep. 93- Oct. 93
18.	Obtain advisory assistance for determining the costs of sewerage service and establishment of the tariff.	Sewerage Section	Jan. 94 Feb. 94
19.	Implement the marketing and financial administration systems.	Mayor	May 94- Aug. 94
20.	Issue revised and corrected water bills for 1993.	Financial Department	Aug. 93 Oct. 93

Chapter 1

INTRODUCTION

1.1 Background

During the month of December 1992, at the request of the USAID Mission, a group of WASH consultants visited Ecuador to conduct an evaluation, in a number of different disciplines, of the various options available to assist in controlling and preventing cholera. Among the direct factors identified by the consultants as impacting on cholera were the quality and quantity of water, the disposal of excreta, and health-related behaviors. Indirect factors included community participation, institutional development, financial planning, and the legal and regulatory environment.

The team of consultants visited the coastal cities of Guayaquil, Machala and Esmeraldas, formulating recommendations for each city as well as for the coastal region as a whole. Following debriefing sessions with USAID/Ecuador, it was determined that, in order to more efficiently administer any follow-on technical assistance to be provided during the remaining life of the WASH Project, which concludes in September of this year, activities should be focused on a single city. Of the three cities visited, Machala was determined to possess the most favorable conditions for implementing cholera-related follow-on tasks by September 1993.

Over the past decade, Machala has grown at a rate of 3.6 percent, and over the past 20 years the growth rate has been 5.3 percent, greater than that of any other urban area in the country. According to the 1990 census, Machala had a total population of 157,600. The intense economic activity that takes place makes this area a pole for attracting population flows.

Through its Water Department, the municipality attempts to supply water to all of its inhabitants, plus an additional 40,000 living in Puerto Bolívar, but finds itself thwarted by the fact that the water distribution network was built in the 1960s to serve a population of 40,000 people, and to date it has neither been expanded nor given proper maintenance.

In addition, the economic situation of the municipality is extremely critical, as reflected in the Water Department, which receives a subsidy on the order of 75 percent from the municipality for carrying out its activities. Among the most important indirect factors evaluated by the team of consultants were currently existing problems of a financial nature. The specific observations made by the consulting team include the following:

- It is estimated that some 60 percent of the city's inhabitants are supplied with water through the water distribution network. However, the IEOS is of the opinion that, as a result of the intermittent nature of the service provided together with illegal connections and leakage, only some 25 percent of the population actually receives

water from the network, with the rest being supplied by tank trucks or simply not receiving any water at all.

- Based on its high rate of growth, it is estimated that Machala could conceivably double its population over the next 15 years, as a result of which the demand for services, and especially water and sanitation services, would increase markedly. Public health could find itself seriously threatened, particularly in view of the presence of cholera, if the delivery of such services does not increase proportionately with population growth.
- Total investment in infrastructure in 1989, including water and sanitation, was only 9 percent of the municipal budget, with recurring costs accounting for 82 percent. For 1992, it was estimated that recurring costs would account for more than 90 percent of the budget.
- Central government transfers account for more than 50 percent of the general revenues of the municipality.
- The increased population growth of Machala and the high level of economic activity are indicative of the fact that there may be financial resources available that have not yet been used.

The team of consultants recommended that, to address these concerns, the municipality of Machala should explore new approaches to dealing with the financing and administration of public utilities.

1.2 Objectives and Scope of Work

Task 462 is aimed at improving cost recovery and financial management in the Water and Sanitation Departments of the municipality of Machala.

1.2.1 Objectives

- a) Evaluate actual and potential levels of cost recovery in the areas of operations, maintenance and administration, as well as capital investments.

Work with the municipality toward implementation of recommendations for increasing cost recovery.

- b) Assess the internal financial management of the municipality as regards:
 - budget accounting
 - cost accounting
 - general accounting

Recommend actions aimed at improving efficiency and economy, and work with the municipality toward implementation of the recommendations.

- c) This task will provide complementary estimates of costs and financial planning for the prefeasibility study for the water management plan.

1.2.2 Responsibilities

A team of two individuals will be responsible for carrying out the following activities:

- a) Participate in an in-country planning session the purpose of which will be to analyze existing background material and provide information to USAID.
- b) Coordinate activities with the task of preparing a prefeasibility study for developing a water management plan for Machala.
 - The team leader will be responsible for this activity, which will require the following to be done:
 - Allow up to three days' time for preparing cost recovery estimates and identifying financing available from other sources for the prefeasibility study for developing a water management plan.
 - Estimate what proportion of the expenditures involved in each option can be covered on the basis of cost recovery mechanisms and how much will need to be provided from other sources of financing.
 - Submit these estimates developed in the field to the WASH Operations Center via fax prior to the conclusion of this task.
 - Apply these estimates to the two objectives of this Scope of Work (see paragraphs c) and d) below).

Use the estimates to demonstrate the cost recovery levels required to cover both operating and maintenance expenses as well as capital investment costs, and emphasize the need for modifications to the current financial management system in order to increase cost recovery and financial self-sufficiency.

- c) Submit to the municipality appropriate recommendations for an effective cost recovery system and work with the municipality to bring about its implementation.

Specific steps should include the following:

- Conduct research in the areas of client demand, capital investments, financial planning, current tariff structure and the legal basis for setting tariffs.
- Identify and analyze those factors impacting on the operation, maintenance and construction of facilities, available financing, and the prospects for recovering costs

from potential beneficiaries, and assist the municipality in establishing mechanisms aimed at recovering the costs of operations, maintenance and capital investments.

- d) Evaluate the internal financial procedures of the municipality and formulate recommendations for improving efficiency and autonomy.

Specific steps should include the following:

- Analyze municipal budgetary procedures, cost accounting procedures and general accounting procedures, and recommend modifications that will benefit the Water and Sanitation Departments.
 - Work with the municipality to implement improved financial management procedures designed to increase the autonomy of the Water and Sanitation Departments.
- e) Draft a report on the consultancy that will address the conclusions reached regarding the prospects for cost recovery, together with recommendations that will enable the municipality to put into practice an efficient system of cost recovery mechanisms, as well as conclusions and recommendations for improving internal financial management.
- f) Debrief the municipality and USAID.

1.3 Methodology

1.3.1 Team Planning Meeting (TPM)

In accordance with the excellent WASH system for initiating a consulting assignment, on Monday, June 14, a Team Planning Meeting was held under the coordination of Dr. Ken Yamashita, Health Officer, USAID/Ecuador, with the participation of Mr. Patricio Murgueitio of the Health Office, Mr. Sonny Low and Ing. María Augusta Fernández of RHUDO, Ing. Adalid Arratia, Coordinator of the USAID-IEOS Program, and WASH economic consultants Elsa de Mena and Jorge A. Infante.

The results of the planning meeting were highly satisfactory, as the following goals were achieved:

- Fully clarify both the objectives of the consulting assignment as well as its scope and final product.
- Become acquainted with the background and current status of the water and sanitation system in Machala.
- Draft the Work Plan and the corresponding Schedule of Activities for Task No. 462, which is the object of the consulting assignment (see Annex No. 1).

1.3.2 Development of the Work Plan

The methodological system employed in developing the Work Plan consisted of the following:

- Meetings with members of the staff of USAID/Ecuador, the municipality of Macisala and the IEOS.
- Reading and analysis of the materials provided by the entities and organizations from which they were requested.
- Perusal and familiarization with background material.
- Design and discussion of cost recovery mechanisms.
- Drafting of a report containing the evaluation and proposals.

1.4 Final Product

The final product for this task consists of a report on the consulting assignment that should include the conclusions and recommendations formulated with regard to the prospects for cost recovery and that will enable the municipality to put them into practice, as well as conclusions and recommendations for improving internal financial management.

Chapter 2

ANALYSIS AND ASSESSMENT OF THE CURRENT STATUS OF THE MUNICIPALITY WITH REGARD TO WATER AND SEWERAGE SERVICES

2.1 General

Machala is a city that has experienced remarkable growth and reflects the problems typically associated with accelerated urbanization and the lack of appropriate municipal controls over such urbanization.

In Machala, the symptoms of poverty are apparently not particularly identified with marginal income but rather with a quality of life that is characterized by the low general availability of basic services. This phenomenon affects even a considerable percentage of the non-poor population.

In Machala, the population does not always set as its top family priority home improvement activities but rather often assigns priority importance to the expenditure of available resources on social activities, parties, etc., which could be better invested in home improvements and in payment for services, since despite the fact that improvements have been recorded in the economic aspects of life, many families continue to live a marginal existence.

In Machala, one of the most difficult problems has been the inability of the municipality to provide services of a quality and quantity that would make it possible for the economic growth experienced by the city to be reflected in services that satisfy the needs of the general public.

With regard to the role played by the private sector in the urban development of Machala, it is obvious that there now exists a high level of dynamic activity in the commercial, industrial and service sectors, which have expressed an interest in supporting actions aimed at encouraging greater urban development, and thereby promoting the further development of economic activity. However, the municipality has not been quick to take advantage of this interest.

2.1.1 Assessment of Machala

Machala is currently the second largest city in the coastal region and fourth largest in the country. The considerable development that it has experienced in recent decades is primarily the result of three factors:

- Its strategic location in a very fertile and adaptable agricultural region, which has made possible the sustained development of agroexport activities.

- The availability of a nearby port, which has facilitated direct shipment of export products.
- Abundant availability of labor for rural activities, especially in the mountainous provinces of the south.

The development of Machala has been based entirely on the considerable dynamics of its primary sector. Here, as in very few other cases, the urban-rural ratio has experienced a fairly cohesive development, which has made it possible to generate collateral urban activities such as commerce and, more recently, industry.

Despite the fact that it is quite obvious that the economic surpluses originating from agroexport activities have not, for the most part, been reinvested in Machala, they have, however, laid the groundwork for a significant level of development of the financial sector, as well as increases in salary levels and other economic activities.

In Machala, salary levels in almost all sectors are greater than those in other cities with similar characteristics. This is true particularly in agricultural activities, as well as in the construction and service sectors.

Machala has grown economically, but from the standpoint of urban planning, this growth has not been organized in a way that will ensure its future as a pole of development.

The effect of the different types of physical growth that have taken place in the city has provided evidence of the low levels of ability of local agents to direct that growth toward an enhancement in the quality of life of its inhabitants. This situation currently discourages investment in the urban area. It would appear that Machala's growth problems have extended beyond the technical and financial abilities of the municipality to deal with them.

2.1.2 Availability of Water and Sewerage Services

a) Water

The city's water distribution networks are deficient in terms of both quality and quantity. No improvement or expansion activities have been implemented for over a decade, which is not only causing considerable difficulties in municipal operations but is also the cause of the enormous pressures being exerted by the population on the municipality, especially in view of the rapid population growth (see Annex No. 2). We were informed that in the month of November 1990, when faced with a shortage of water, both the city and the province declared, with the support of the Office of the Mayor, that they would shut off supply indefinitely in order to request from the government an appropriation of S/.2.5 billion for increasing the supply of water, among other public projects. Some 57 percent of the population is without residential water service, and the owners of those properties that do have water find themselves needing to install storage tanks or cisterns, as rationing is a commonplace occurrence.

In the recently colonized poor neighborhoods, water is supplied by means of tank trucks, and even in those neighborhoods that are already well consolidated, the supply of water by tank trucks is also a common practice, since most of the time water is never actually delivered, despite the existence of a distribution network. Water losses are estimated to run at about 60 percent, of which between 15 percent and 20 percent is attributable to illegal users.

Of all of the critical service-related problems existing in Machala, water distribution is the most important, as its nonavailability for almost half the population creates unsanitary conditions, diseases, pollution, etc. Water distribution is much worse in newly developed areas, although it is also deficient in areas classified as "residential". There have been few private sector attempts at urbanizing. Of these, most have opted for local sources of water capture, such as wells, as an alternative to relying on the main distribution network.

b) Sewerage

Machala's location places it in a difficult position with regard to waste water disposal, as the latter must be discharged directly into the sea, which is located at virtually the same level as the city. Generally speaking, the system of sewerage networks is quite deficient, as evidenced by the flooding that occurs throughout virtually the entire city during rainy season. Such flooding brings with it serious pollution problems since, as a result of the poor quality of the networks, it is quite easy for waste water to directly contaminate clean water sources, which has happened on several occasions.

Industrial waste and discharges also constitute a serious problem and one that will become more critical in the future, in view of the economic attraction that the city holds for agricultural and agroindustrial activities. Such industrial waste products are currently discharged directly into the existing sewerage system and no control is exercised over them.

We have been informed that there have been many cases in which families, and particularly children, have become seriously ill from pollution, especially as it affects both the skin and the stomach, since in most poor settlements, because there is no sewer system, waste is discharged directly into small rivers and streams. When it rains, these streams become swollen, with consequently serious consequences.

Discharge of waste water in neighborhoods not served by the sewer system is made directly into ditches or streams and, to a lesser extent, through latrines, and since the water table is virtually at surface level, this practice becomes more dangerous.

2.2 Current Cost Recovery System

2.2.1 The Demand for Safe Water

As mentioned above, it is estimated that only 43 percent of the population is supplied with safe water through the public distribution network. The rest of the population either obtain water from wells that they themselves dig or purchase water from tank trucks. There is no system in place for measuring either consumption or supply. In order for the Regional Treatment Plant, which has been under construction for over 10 years, to begin operating and thus satisfy consumer demand for water, an amount on the order of S/.2.0 billion is needed. As a result of a presidential commitment apparently made during a visit on June 25, the plant is to commence operations during the first quarter of 1994.

For purposes of the financial projections, a demand of 250 liters/inhabitant/day was calculated, including a percentage for losses. A figure of 4.2 inhabitants per connection was assumed (based on the census), as a result of which the monthly estimated demand per connection came out to be 32 cubic meters.

2.2.2 Capital Investments

The municipality has made no investments in the water and sewerage sector during the past decade, nor have any expenditures been made to ensure proper maintenance of service facilities, which show signs of serious deterioration.

The investments that the present municipal administration plans to carry out during the second half of the current year are listed below:

a) Reconditioning of Water Distribution Networks in the Central Sector of the City

Approximate Amount: S/.800 million

Source of Funds: Government budget, through the Ministry of Finance

Implementation Period: July through December, 1993

Amortization Period: These are nonreimbursable funds since they were provided by means of a direct allocation by the government for public works projects

Benefit: To improve supply and reduce leaks

b) Construction of Two Wells (included in the prefeasibility study prepared by Ing. Arniella)

Approximate Amount: S/.1.0 billion

Source of Funds: 55 percent from FONDORO (Sectional Development Law)

45 percent from government allocations budgeted by the municipality

Implementation Period: July through December, 1993

Amortization Period: These are nonreimbursable funds since they were provided by means of a direct allocation by the government for public works projects

Benefit: To supply an additional 220 liters per second

c) Prefeasibility Study for the Machala Integrated Water System (update of a study conducted in 1987)

Approximate Amount: Contracted directly by the PDM

Source of Funds: Banco del Estado (100 percent)

Implementation Period: The study is to be delivered by the end of June

Amortization Period: These are nonreimbursable funds since their purpose is to fund a prefeasibility study

Benefit: To study the prefeasibility of the construction projects contained in the Prefeasibility Plan for Water Management in Machala

Comments: Once the prefeasibility study is finished, the Banco del Estado will commit credit funds provided by the IDB and the World Bank, together with national counterpart resources in the amount of US\$30 million, for the national highway system as well as for water and sanitation activities. The consultant preparing the study is conducting a survey of beneficiary payment capacity and willingness to pay and will determine whether or not the project is profitable.

2.2.3 Financial Planning

Neither the municipality, nor specifically the Water Department, have in place a financial planning system with the capacity to generate information for decision-making purposes. This issue is analyzed in greater detail in Chapter 3, section 3.3.

2.2.4 Current Tariff Structure – Legal Basis

There is no legal basis for applying tariffs, since by order of the Mayor an adjustment was made, as of January 1992, from S/.20 to S/.24 per cubic meter.

It cannot truly be said that there is a tariff structure in place for water service, and for sewerage service there is no tariff at all.

The following fees for water service are currently being applied:

a) Residential Service

- For the lower and middle classes: minimum estimated consumption of 30 m³ per month, at S/.24/m³, for a monthly total of S/.720.
- For the residential class: area of construction factor of 0.3 = m³
 $m^3 \times S/.24/m^3 = \text{monthly amount}$
Minimum = S/.720 per month.

b) Commercial Service

- Estimated minimum of 90 m³ per month, at S/.24/m³. When the area of construction is greater than 300 m³, a factor of 0.3 is applied to obtain consumption.
- $m^3 \times S/.24/m^3 = \text{monthly amount}$
Minimum = S/.2,160 per month

c) Industrial Service

- Estimated minimum of 300 m³, at S/.24/m³.
- In accordance with the purposes for which the water is used, minimum consumption is estimated to be equal to S/.7,200 per month.

With such negligible fees per cubic meter, it is impossible to cover the costs of operation, maintenance and administration. This is a ridiculous situation, as in the rural systems in operation in the province of El Oro, an amount of S/.250 per cubic meter is charged.

Collection of water fees takes place through the issuance of annual advice of assessment, which almost no one pays. Moreover, the municipality does not currently have available a mechanism for collecting amounts due.

In addition, the Schedule of Users is totally out of date and is kept manually by a single employee.

2.2.5 Supply of Water by Tank Trucks

Those households not served by the water distribution networks or which are affected by rationing as a result of limited supply, a situation that is made more critical by increasing degrees of leakage, are supplied by tank trucks.

The tank trucks take the water from the La Lucha Treatment Plant or from wells and the municipality charges them S/.1,000 for the 7 m³ held by one tank truck, i.e, one cubic meter of water costs the tank truck owners S/.143. The tankers charge S/.4,000 per cubic meter.

A middle or upper class family with no water service from the distribution network pays the tankers S/.600 per month for 15 m³ of water but, based on current water fees, will pay the municipality S/.830 for 35 m³, which on a yearly basis totals S/.10,000.

Marginal or lower class families pay S/.800 for a 200-liter tank every three days, i.e. 10 tanks per month, which amounts to S/.800 per month for two cubic meters. They will pay the municipality S/.720 for 30 cubic meters a month, which is indicative of the existence within the community of both a willingness and the ability to pay such a fee.

2.2.6 Fees

The amounts charged for connections (installations) of water or sewerage services are not the result of any cost study. Accordingly, such costs are likewise not being covered.

Currently, the amount of S/.16,500 is being charged for each 1/2" diameter connection S/.34,000 is being charged for each neighborhood connection to a 1/2" diameter trunk line and S/.211,000 for each connection to a 3/4" diameter trunk line.

With regard to sewerage, the amount of S/.2,000 per linear meter of frontage is charged for service connection, but we are advised that the municipality has suspended collection of this fee pending the implementation of a cost study.

2.2.7 Factors Impacting on Operations, Investments and Cost Recovery

a) Operations

Factors identified which impact on operations and maintenance are as follows:

- Lack of technical know-how by the workers who service the networks. This causes fully half of the problems, since such workers can connect one loop of the system to another without being aware that they are placing the system into a state of imbalance.
- Previous mayors have failed to get to the root of the problem, as they have not seen it as being important.
- Apparently there are vested interests set on preventing completion of the Regional Treatment Plant.
- There is no budget for maintenance.

b) Investments – Construction – Financing

Among the factors having the greatest impact, the following were identified:

- Attempts have been made to provide service to the most recent settlements, rather than making improvements to the existing system.

- When the network improvement study was conducted in 1987, the Banco de Desarrollo del Ecuador had no funds available and took a considerable amount of time to process requests, as a result of which the mayors felt that it was not politically feasible to apply for credit, since their entire four-year period of tenure would be consumed in conducting a prefeasibility study, conducting a feasible study, obtaining the credit and beginning construction of the project.
- The high interest rates for credit.
- The absence of cost-benefit studies to justify projects, which as a rule were poorly prepared and occasionally oversized, as a result of which they were never approved by the financing entities.

c) Cost Recovery

- Basically, the only existing factor is the lack of appropriate systems for establishing tariffs, special improvement assessments, and water and sewerage fees, largely as a result of negligence.

Chapter 3

EVALUATION OF THE INTERNAL FINANCIAL PROCEDURES OF THE MUNICIPALITY

In accordance with the provisions of the Scope of Work and following the corresponding coordinating and planning sessions, we proceeded to conduct an evaluation of the financial operations of the city of Machala. In performing this task, it was not possible to disregard the circumstances surrounding the operations of the institution and the performance of its employees. The physical aspect of the building is one of dirtiness and neglect, to the extent that it precludes any possible attitude of respect by the general public or dignified and friendly conduct by its officers and employees. Facilities for dealing with taxpayer concerns and for carrying out the various other activities of the municipality present a picture of total deterioration, and in many places the most basic elements of administrative support are lacking entirely.

The physical condition of the building, together with continuous delay in the payment of salaries, explains to a large extent the general lack of interest in work activities, the generally demoralizing atmosphere with respect to achievement of institutional goals and objectives, the lack of credibility of future endeavors, and the need to seek complementary income outside the municipality.

The following analysis shows that formal aspects such as organizational structure, methods, procedures and financial reports cease to be considered important when the institutional image is so negatively affected, as they tend toward poor performance in terms of results.

3.1 Functional Organic Structure. Operational Setup of the Financial Area

Annex No. 3 shows the structural organization chart of the municipality. Even though for purposes of complying with the objectives of the assignment we have stressed the analysis of the financial area, a general overview is also provided of the organization as a whole.

It should be pointed out that functional disaggregation is explicit in the creation of the various departments and sections, which should have ensured a decentralized and efficient management function governed by appropriate coordinating and planning mechanisms. If this is not the case, we must assume that there are internal factors that hinder the achievement of successful results, as it is a given that functional-organic structure and interdepartmental relations can determine particular management results.

The Financial Department, which for all practical purposes embodies the financial management of the municipality, is an administrative support unit that is responsible for financial and

physical resources. The functions performed by the sections reporting to it cannot be classified as being related to "financial management", which involves a dynamics that includes identification of financial policies, planning, evaluation of results, rectification of procedures, formulation of well-grounded recommendations with regard to management functions, etc.

The Financial Department includes eight sections:

- Appraisals and Cadaster, Properties, and Revenues, the operations of which are closely related to their objectives.
- Procurement and Warehouse, support for which requires broad coordination in order to ensure compliance with their objectives.
- Accounting and Treasury, whose function of administration of, and control over, financial resources involves a closely linked relationship.
- Computer Operations, as a source of general data processing support for all areas of the Financial Department.

3.1.1 Appraisals and Cadaster, Properties and Revenues

Appraisals and Cadaster is responsible for conducting and maintaining the cadaster, the valuation of properties based on reference patterns of the cost per square meter of land and type of construction. It covers both private as well as municipal property, where its activities support those of the Property Section. In turn, its appraisals provide support to the Revenues Section. However, it would appear that an analysis needs to be conducted with a view toward clearly defining the functions of this section and determining whether or not it will be necessary to provide separation between different areas in order to avoid administrative difficulties that might impact on operational functionality.

In Appraisals and Cadaster, computer-based processes have been initiated for the listing of properties in nominative form, with considerable effort having been made to keep it current. However, it can be seen that the lack of confidence in the computerized system has led each employee to maintain parallel manual records. In addition, it is apparent that the system does not satisfy the cadaster's total information requirements, as a result of which parallel records continue to be kept simultaneously on large ledger cards, which require considerable physical space for filing.

The identification of zones, sectors, blocks, lots, etc., on a map of the region, along with the corresponding field work, which is carried out on a continuous basis, provides the basic information for the records. In this way, the process of updating information with regard to improvements made to existing edifications or new civil works projects is carried out continuously, thus increasing property appraisal, even though in accordance with the legal mandate normal property appraisals are to be updated every five years.

The Property Section keeps records of municipal properties which, according to data provided, number 12,671 (they account for 42.2 percent of the total number of properties recorded — 30,000 — as of December 31, 1992). It maintains controls over lessees (a large number of these lands have been invaded and the municipality has leased them out until such time as it is able to sell them to the lessees).

The cadaster system includes information on the total area of the property as well as its appraisal, its lease rate and other surcharges, and issuance of the Advice of Assessment for collection of amounts owed.

The Revenues Section is charged with issuing collection advice covering revenues from real estate or revenues on properties, in the case of municipal holdings. However, since the system combines these activities, it would appear that the Revenues Section should be limited to budgeting and evaluation of revenues, as a support function for the budget process performed by Accounting Section.

It is evident that, despite the installation of the computerized system, outdated operating practices continue to be observed. Thus, for example, when a taxpayer arrives to pay his taxes, he is given a ticket in one area (Appraisals and Cadastre) and must then go physically to another area (Treasury) to actually effect payment, when everything should actually be taken care of in the same section (issuance of ticket and collection of payment). The explanation given is that collections are a function of the Treasury Section, which implies that the advantages of computerized linkages are not yet properly understood.

3.1.2 Procurement and Warehouse

These two administrative support sections are closely interrelated from an operational standpoint on the basis of their procurement and warehousing of goods.

Between five and six different forms are required to requisition an item:

- a) Order Requisition: filled out by the requesting officer.
- b) Purchase Order: form filled out by the head of the Procurement Section, who returns it for the signature of the requesting party and the Financial Director. The procedure involves compliance with the legal requirement of requesting two or three quotations.
- c) Check-Voucher: indicates what is to be purchased. It is forwarded to the Office of the Budget (either to be charged against the budget or for authorization of the appropriation or purchase) and then to the Accounting Department for issuance of the check and signature of the Financial Director.
- d) In the Warehouse Section, goods procured are received on the basis of a Warehouse Delivery Order. The invoice is stamped and the article is then sent to whomever requested it.
- e) The latter step is performed on the basis of the Warehouse Withdrawal Order form.

- f) In the case of fixed assets, a form entitled Acknowledgment of Responsibility for the Article must be signed. Withdrawals from the warehouse require the signature of the requesting party, the Financial Director and the warehousekeeper. It should be pointed out that urgently required procurements do not always comply with the requirement that they be delivered to, and subsequently withdrawn from, the warehouse; rather, the expenditure is charged to expenses all at once. There are three warehouses in operation, where inventories are kept using the Kardex system.

A computerized support system using "electronic spreadsheets" is currently being installed.

3.1.3 Computer Operations Section

Possibly as a result of the direct service that it is supposed to provide to the financial area and also as a result of the importance and high priority assigned to the collection function, this section was placed in the Financial Department.

The chief of this area is said to be a systems analyst (from the Guayaquil Polytechnic Institute) who works with two assistants to whom he has provided practical training.

The computer equipment was procured under the preceding administration, although it has only recently begun to be used.

Hardware consists of an IBM PS/90/XP computer with 486 processor and 4 megabytes of RAM, installed in a Novell network system with 10 PS/30/283 terminals.

The terminals have been installed in the following areas:

- Appraisal and Cadaster (one is out of order)
- Treasury
- Accounting (not in use)
- Personnel (the system is not yet operating)
- Urban Planning (used only for schedule control)
- Cables have been run to the Water Department (there is no terminal)

Software: Attempts have been made to develop programs at the internal level without any prior research as to options available in the market.

The only program developed so far is one for the Cadaster, which is used, as indicated previously, to collect the property tax by issuance of the advice of assessment when taxpayers arrive to make payment.

This advice includes all of the various taxes that must be paid by the taxpayer: real estate, lease of land, water bill, special improvement assessments, etc.

This new operating scheme has eliminated from Accounts Receivable, or Portfolio, information related to outstanding liabilities payable, collection of which it is explained further below.

In general, the computer system is at an incipient stage, and we were able to observe the lack of technical support existing within the municipality as well as the lack of maintenance support by a specialized firm.

The latter function is supposed to be performed by Xerox, the vendor that sold the equipment, but since the sale has apparently not been finalized (and accordingly payment has not yet been paid), the municipality receives no maintenance service. Employees have periodically experienced equipment shutdowns, which leads us to believe that the vendor may have incorporated certain key commands designed to shut down the equipment from time to time and thus pressure the municipality for payment.

The lack of an agreement covering the purchase and "definitive receipt" of the equipment has had the effect of diluting responsibilities. It was observed that a portion of the electric control equipment (voltage stabilizers) are out of order. In addition, the total purchase included a high-volume copy machine which the municipality does not need. The copier continues to remain stored, unpacked, in the procurement area and faces a serious danger of deterioration, which would create even greater conflict between the vendor and the municipality.

All of the above generate distrust among the staff as regards the use of the equipment and contribute in all cases to a preference for the use of the parallel manual system.

3.1.4 Accounting and Treasury Sections

The functions of the Accounting Section include recording of transactions, applying control measures prior to issuance of payment checks, and performing budget functions for the municipality. There is no separate section for this function, as we are told that a separate entity is not required.

The Accounting Section complies with the requirements established by the Government Auditing Office, observes government accounting guidelines and records transactions on a cash basis. It prepares a statement of operations on a quarterly basis and a balance sheet at the close of year-end operations.

The accountant informs us that the Government Auditing Office is preparing an accounting manual specifically for municipalities. It is apparent that the intervention of members of the municipal staff is passive in nature, as they do not wish to create problems with the Auditing Office and simply comply with all resolutions handed down in this regard. Nevertheless, they are aware that certain provisions are creating distortions in the books of account. Thus, no "urgent" changes are anticipated to the accounting system required by a municipality that must deal with a number of different areas designed to ensure the welfare of the community — water, sewerage, garbage collection, slaughterhouse operations, markets, etc. — and which should be reflected in a cost accounting system as well as in the analysis of results by sectors, which would indicate their respective administrative efficiency.

The Accounting Sections performs all procedures manually. No software has been installed for this function and the staff are wary of using their computer terminals since system failure is a common occurrence and they fear the possible loss of data.

Since the issuance of the advice of assessment is the responsibility of the Appraisal and Cadaster Section, for subsequent liquidation at the tellers' windows in the Treasury Section, the functions of the latter are limited to performing basic activities involving receipt of funds. This section prepares a daily revenue report and forwards it to the Accounting Department, where transactions are posted on a monthly basis.

In addition, this unit distributes checks for payment. The checks are issued by the Accounting Department.

The Treasury Section does not prepare either a cash flow or a liquidity analysis. The individual in charge of this area is quite old and has performed this function in the municipality for many years.

In general, it is evident that the Financial Director signs a large number of documents with respect to which it is physically impossible to exercise any degree of control, as a result of which his signature lacks significance in this regard. In addition, check signing is an activity that prevents management from achieving optimum performance, as a result of which appropriate delegation schemes should be studied.

3.2 Analysis of Financial Statements and Reports

3.2.1 Balance Sheet

The balance sheet as of December 31, 1992, was made available to the consultants for analysis.

Following the most recent changes introduced by the Government Auditing Office, the balance sheet of the municipality reflects a negative net worth on the order of S/.700 million.

a) Assets

The changes that were made have affected current assets by eliminating from this group of accounts the municipality's portfolio. The Accountant indicates that, in accordance with the Government Accounting Manual, taxes or levies collected by municipalities or sectional units are recorded with the issuance of advice of assessment, which must be posted in the appropriate memorandum account. For this reason and based on recommendations made by the Government Auditing Office, Accounts Receivable balances were transferred to memorandum accounts. Finally, in accordance with the operating plan for data processing, advice of assessment are no longer issued, with the result that now they will no longer even

be reflected in the memorandum accounts. Under the new system, the advice of assessment constitutes receipt of payment.

As a result of the changes in accounting procedure, a portfolio of close to S/.1.8 billion was eliminated from current assets, to be recorded as a mere contingent asset. Of that total, S/.909.4 million represents accounts receivable for water fees.

The Short-Term Contractual Advances account constitutes a representative line item (S/.659.8 million) within the context of amounts included in the financial records. However, it was not possible to establish any degree of correspondence with projected investments since the 1993 budget was not available. We were informed that CONADE did not give its approval to the budget as it felt that revenues had been overestimated and because no supporting evidence was submitted. At any rate, 1992 investments constitute a valid point of reference, as the 1993 figure is virtually identical.

With regard to Fixed Assets, an important change involves the fact that the individual accounts included in this group are now used only to record assets that the municipality is currently using in its operations.

Thus, for example, 12,760 municipal properties which are currently leased out, are not recorded as assets of the institution. However, they have an estimated value of almost S/.600 million.

Likewise, municipal construction works, recorded as Construction Works for Public Use in Progress, which were previously included as a fixed asset account, are now recorded in memorandum accounts. This item reflects a total balance of S/.800 million. Once the Certification of Delivery-Receipt covering these construction projects is signed, they are eliminated from Memorandum Accounts, with no further record of their existence. Likewise, neither are the water distribution and sewerage networks recorded as fixed assets. Some officials have indicated that because these assets are not recorded on the books of the municipality, people think that they have no owner and that accordingly they can appropriate or occupy them or otherwise fail to respect them.

The Others group includes the Long-Term Private Sector Financial Investments account which is used to record shares of stock in the Banco del Estado and which has nothing to do either with "financial investments" or the "private sector".

b) Liabilities and Net Worth

In the Current Liabilities group of accounts, the Notes Payable Private Sector account refers to credits received from the private banking sector. The commercial ties established with the banking community also explain the existence of a negative balance in the Banks account, which reflects an overdraft by the municipality.

The Accounts Payable Private Sector account is the most representative among the short-term liabilities and reflects primarily municipal transactions with suppliers.

Since the municipality is a tax-withholding agent, all withholdings of income and other taxes established by law with regard to payments to contractors are included in the amount of S/.200 million in the Third Party Funds Payable to the Public Sector account.

The insolvency of the municipality with regard to its employee liabilities payable is the result of its inability to fulfill its obligations with the Social Security Institute. In order to resolve this situation, the municipality has signed a Delinquency Settlement Agreement by means of which outstanding social security obligations will be paid off in installments. This liability is recorded in the Long-Term Public Sector Notes Payable account.

In addition, the municipality must pay debt service on an external credit which originated in a hydraulic landfill in a particular sector of the city and which was contracted under the Government to Government program.

To conclude, as a result of the various accounting changes instituted, primarily with regard to the elimination of the portfolio and Construction Works for Public Use in Progress from the asset side of the municipal balance sheet, a procedure which is not consistent with the allocation of funds or with the movement recorded on the operating statement, from an accounting standpoint the municipality has a negative net worth. In accordance with government accounting procedures, the Available Net Worth account shows a deficit of S/.669.6 million, which has caused a decrease in the ratio of current assets to current liabilities. In addition, this restricted net worth may be considered to be no longer meaningful as it bears no relationship to assets totaling S/.797.5 million invested in construction works in progress.

Despite the liquidity difficulties that might be apparent on an examination of the municipal balance sheet, the operating statements for 1991, 1992 and the first three months of 1993 reflect a representative surplus in all cases, which is not consistent with problems involving delays in making payments, including salaries.

3.2.2 Operating Statement

The evolution observed in revenue generation indicates that the municipality has put forth a considerable effort to increase current revenues, on the one hand by increasing the bases for appraisal and, on the other, with the more expeditious recording of new properties and improvements made to existing properties. An additional source of revenues is the sale of municipal lands, collection of outstanding accrued interest on financing, and the transfer of its portfolio to the banking sector in order to accelerate recovery, although it should be mentioned that this latter operation turned out to be extremely costly for the municipality since the transactions were conducted at market prices.

As a result of the deficiencies in providing water distribution and sewerage service, water service is not billed on a monthly basis. Advice of consumption are issued annually, as is the case with property taxes, in order to diminish the impact of charging for a service which in

many cases is not provided. Advice for 1993 have not yet been issued, although a total of S/.200 million has been collected on outstanding balances from prior years.

Sewerage service is not charged specifically, and charges made for connecting sewerage service are recorded in an umbrella account entitled Community Services.

A comparison of the statement of revenues and expenses for 1992 and 1993 on an annual basis reveals that tax revenues experienced substantial increases on the order of 127.1 percent, whereas non-tax revenues increased by 91.6 percent, both of which in any case represent positive increases in real terms. Since expenditures did not increase at the same rate, the municipality will be able to take on construction works that will increase its credibility with the general public and serve to maintain confidence in the municipal program.

It is important to note that the increase in taxes and assessments should be accompanied by services and construction works designed to benefit the community because, if this is not the case, such a policy will lead to the total discredit of the municipality and could even lead to violent public reactions with extremely negative consequences.

The Financial Department apparently does not produce any other type of informative report. Generally speaking, we have observed a lower level of willingness to provide information, perhaps brought on by the distrust surrounding previous investigations, a lack of job security and also, evidently, as a precaution to prevent information from possibly reaching the Government Auditing Office. With very few exceptions, staff members assume a hostile attitude toward outsiders as well as in their dealings with the public within the municipal offices. Seminars on personal motivation or interpersonal relationships, among other subjects, could help to bring about a change in employee attitude.

3.3 Accounting and Budgeting Methods and Procedures, and Information Flow and Capture

With regard to the Accounting Section, in addition to the above it should be observed that despite the large number of service areas that the municipality must deal with and which are reflected in the Structural Organization Chart (see Annex No. 3) — this is the case, for example, with the Department of Public Services, which has sections for dealing with slaughterhouse operations, markets, cemetery operations and street cleaning, as well as the Department of Public Works which includes, among other things, a Section for sewerage, and the Water Department, Department of Justice, Police and Security, etc. — the accounting records do not reflect these activities or any corresponding information regarding demands, requirements, revenues and expenditures. Accordingly, it is not possible for management decisions to be made on the basis of accounting information, although in the particular case of water distribution service, a Statement of Expenses is available (see Annex No. 7 — 7.2).

By recording all transactions in general accounts and, in addition, by presenting only annual financial statements, the accounting function is limited to a simple recording of figures and fails to generate valid information for decision-making.

It is evident that the relationship existing between the various sections of the Financial Department is not conducive to improved information flow. The Accounting Section, for example, has no requirement regarding management information, as a result of which its objectives consist in providing information to the Control Unit.

Budget procedures involve estimating revenues and expenditures in accordance with existing law, for example, using the average of the three most recent years with respect to revenues. With respect to expenditures, and especially salaries, care is taken to ensure that no one earns more than the President of the country, i.e., S/.300,000 per month. Based on its interpretation of this legal framework, the municipality must resort to a series of cover-up maneuvers to generally disguise salaries and expenses as well as to justify revenues.

Finally, since CONADE did not approve this year's budget, which had already had been approved by the Municipal Council, they have opted to send a proforma draft to CONADE for approval.

This entire antiquated and cumbersome process is based, in the first place, on the distrustful stance taken by CONADE, an entity paying low salary levels, whose employees view with suspicion any attempt to institute salary increases for the personnel of the sectional entities and, secondly, on the lack of professional ability of municipal employees to prepare technically correct budgets and the fear of government regulatory agencies, as a result of the various legal implications that could affect them personally. The lack of security precludes an open discussion with such regulatory agencies, as a result of which the criteria espoused by the latter continue to prevail, even to the detriment of sound municipal initiatives.

Chapter 4

ESTIMATE OF THE COSTS OF INVESTMENTS, ADMINISTRATION, OPERATION AND MAINTENANCE OF THE MACHALA WATER DISTRIBUTION SYSTEM AND CORRESPONDING COST RECOVERY MECHANISMS

4.1 Investments in the Expansion and Improvement of the Water System for Machala and Puerto Bolivar

Total investment, excluding the total amount for construction works and outfitting of wells, which will be financed with funds from FONDORO and the municipal budget (these are nonreimbursable funds as they represent government transfers) and which will be implemented during the second half of this year, amounts to S/.32,238,437,000 (see Annex No. 4).

4.1.1 Costs of Water Meters and Recovery of Those Costs

From the above figure, the amount corresponding to water meters is deducted since their cost will be recovered from the beneficiaries, who will be charged directly. This cost is as follows:

30,000 Meters at US\$70 each	=	US\$ 2,100,000
10 percent engineering and administration	=	210,000
15 percent contingencies	=	<u>315,000</u>
TOTAL	=	US\$ 2,625,000
US\$2,625,000 x S/.1,925	=	S/. 5,053,125,000
UNIT COST	=	S/. 168,437.50

Of this amount, 80 percent would be recovered and 20 percent would be subsidized by the FIM (see Annex No. 5). Accordingly, the beneficiary would be charged S/.134,750 which, with financing over a maximum of 24 months and an interest rate of 36 percent, gives a monthly payment of S/.7,960.

4.1.2 Costs of System Expansion and Improvement Projects and Recovery of Those Costs

The cost of these projects, after deducting the cost of the meters, totals S/.27,185,312,000, which can be recovered, in accordance with the provisions of the Law of Municipal Administration, by means of the Special Improvement Assessment mechanism (see Chapter 5, paragraph 5.4).

It is estimated that 80 percent of this amount could be recovered and that 20 percent could be subsidized by the FIM, as established by PDM guidelines (see Annex No. 5).

$$S/.27,185,312,000 \times 80\% = S/.21,748,250,000$$

The estimated number of homes or properties that would benefit from the improvement and expansion of the water distribution system totals 60,000, consisting of current users plus those who would benefit from such improvement and expansion works and would be added to this system through the year 2004. The corresponding calculation is as follows:

$$S/.21,748,250,000/60,000 = S/.362,470.83, \text{ average per beneficiary, which when financed over 36 months at an interest rate of 36 percent per annum would provide an average monthly payment of } S/.16,600, \text{ which in turn gives a total amount, including interest, of } S/.35,856,000,000.$$

In accordance with the socio-economic configuration that has been estimated for the various households involved, average payment, broken down by socio-economic level, would be as follows:

CLASS	% COMPOSITION	DISTRIBUTION OF BENEFICIARIES	AVERAGE MONTHLY FEE	TOTAL AMOUNT INCLUDING INTEREST FOR 36 MONTH
Low	30%	18,000	S/. 8,250	S/. 5,346,000,000
Middle	55%	33,000	18,900	22,453,200,000
Upper, Business and Industry	15%	9,000	24,900	8,067,600,000
TOTAL	100%	60,000	S/. 16,600	S/.35,866,800,000

The average monthly amount of the S/.16,600 fee as a Special Improvement Assessment as a percentage of the monthly amount of the real minimum wage, which as of July 1 amounted to S/.173,667 (see Annex No. 6), is only 9.56 percent, and when compared to the estimated fee for the lower class, it represents only 4.75 percent.

The average monthly fee of S/. 16,600 is equivalent to purchasing the following products:

3 beers at S/.1,100	=	S/. 3,300
3 packs of cigarettes at S/.2,000	=	6,000
3 liters of Coca-Cola at S/.2,500	=	<u>7,500</u>
TOTAL	=	S/.16,800

4.2 Annual Costs of Administration, Operation, Maintenance, Depreciation and Block Water Supply of the Regional Treatment Plant and Recovery of Those Costs

These annual costs were projected at current levels for a period of ten years. It was found that the year for which they were highest was 1988, since that was the year in which the new system became operational and in which the average cost per user was S/.9,989 per month. Annex No. 7 contains a detailed breakdown of the financial projections as well as the basis used to prepare the calculations.

The recommendations of the World Health Organization (WHO) suggest that, for the poorest families, the monthly cost of water service should be approximately one day's minimum wage for a consumption of 20 cubic meters. Based on the prevailing minimum wage, the monthly cost would be on the order of S/.5,790, or US\$3.05.

4.3 Summary of the Monthly Payment for Purposes of Cost Recovery

To summarize, the total monthly payment for a lower class user with adequate piped water service at current prices would be as follows:

Meter (24 months)	S/. 7,960	US\$ 4.20
Special Improvement Assessment (36 months)	S/. 8,250	US\$ 4.34
Monthly Payment of Water Fee (20 m ³)	S/. <u>5,790</u>	US\$ <u>3.05</u>
TOTAL	= S/.22,000	US\$11.59

This amount represents 12.67 percent of the monthly minimum wage, i.e., almost four days' minimum wage, an amount considered to be consistent with the payment capacity of the lower class population of Machala.

The monthly payment of S/.22,000 is equivalent to purchasing the following items, which are not basic staple items and are considered to be harmful to one's health:

6 beers at S/.1,000	=	S/. 6,000
5 packs of cigarettes at S/.1,700	=	S/. 8,500
3 liters of Coca-Cola at S/.2,500	=	S/. <u>7,500</u>
TOTAL	=	S/.22,000

Chapter 5

ANALYSIS OF THE LEGAL BASIS FOR THE CREATION AND OPERATION OF THE MACHALA MUNICIPAL WATER AND SEWERAGE ENTERPRISE, AS WELL AS FOR THE RECOVERY OF INVESTMENT AND RECURRING COSTS

Given the importance of the legal aspects of both the creation of the Municipal Water and Sewerage Enterprise as well as the establishment of the mechanism or system necessary to make it possible to effectively recover costs, the consultants felt that it would be critically important to conduct an analysis of the appropriate articles of the Law of Municipal Administration that provide the basis for the legal feasibility of these actions.

5.1 Title I: General Provisions

CHAPTER II On Municipal Objectives

Article 14 "In order to fulfill its purposes, the Municipality shall carry out the functions assigned to it herein, preferably directly, or under contractual or concessionary arrangements when deemed more advisable "

Article 15 "The primary functions of the Municipality are ...: 1) Provision of safe water and sewerage systems; ..."

5.1.1 Analysis and Observations

- The law provides that the Municipality shall carry out its functions directly, but that, if it is considered to be more advisable, it may do so under contractual or CONCESSIONARY arrangements, which is very important.
- Article 15 establishes among the primary functions of the Municipality that of providing safe water and sewerage systems.

5.2 Title III: On Municipal Administration

CHAPTER I On the Functions of Municipal Administration

Section 2 On the Functions

Paragraph 3 Public Services

Article 163 “With regard to public services, the municipal administration is charged with:

... b) Providing, either directly or under contractual or concessionary arrangements, local public services ...; c) providing safe water and sewerage services to the towns within the *cantón*, regulating water use, and doing whatever is necessary to ensure the supply and distribution of water of an appropriate quality and in a sufficient amount for both public and private consumption; ...; e) ... the cost of connecting and installing public lighting and safe water to homes or other properties will be for account of the owners, whereas the cost of the performing necessary repairs to the streets and sidewalks will be for account of the Municipality;”

CHAPTER II On the Administrative Structure

Section 2 On Municipal Enterprises

Paragraph 1 On the Constitution of Enterprises

Article 194 “The municipality may constitute public enterprises for providing public services”

Paragraph 2 On Definitions and Management Entities

Article 197 “The Municipal Public Enterprise is an entity created by ordinance, having legal existence and administrative and patrimonial autonomy, which operates on commercial principles and whose objective is the provision of a public service for which a fee or price, together with appropriate assessments, is charged.”

Paragraph 3 General Provisions

Article 206 “With regard to the constitution of Municipal Public Enterprises ..., the Municipal Council shall intervene in the approval of the rates and of the services to be provided, in the absence of which such rates may not be levied.”

Article 210 “Each Municipal Public Enterprise shall keep its own accounting records in accordance with commercial principles ..., in such a way that it will be possible to determine clearly and precisely the operating costs for providing such public services and the financial results of the enterprise.”

5.2.1 Analysis and Observations

- As can be seen, Article 163 of the Law assigns to the Municipal Administration responsibility for providing safe water and sewerage services in towns located within the *cantón*.
- Article 163 also provides, in subparagraph e), that the cost of connecting and installing water distribution service will be for account of the owners of the houses or properties.
- Article 194 empowers the Municipalities to constitute public enterprises for providing public services. This articles provides the legal basis for creating the Water and Sewerage Enterprise of the Municipality of Machala.
- In Article 197, the Law provides that the municipal enterprise shall be created by ordinance, with administrative and patrimonial autonomy. However, the most important aspect of this article refers to the statement establishing that the enterprise “shall operate on commercial principles” and that “a fee or price, together with the appropriate assessments, will be charged” for the public services provided.
- In the opinion of the consultant, the above should be interpreted to mean that, when operating on commercial principles, the fee or price and the assessments should include the entire amount of all costs, including investment costs, incurred with regard to the provision of the services, as a result of which cost recovery should be complete and based on real amounts.
- Article 206 establishes that fees may be applied only after approval by the Municipal Council.
- With regard to the accounting system of the enterprise, Article 210 is quite clear in establishing that such accounting records should be based “on commercial principles” and that in addition they should make it possible “to determine clearly and precisely the operating cost for providing the public services and the financial results of the enterprise”. Thus, in order to comply with the provisions set forth in this article, it is necessary for the enterprise to have installed and in operation a financial and cost accounting system.

5.3 Title VII: On Municipal Fees

CHAPTER I General Provisions

Article 397 “Municipalities may apply compensatory fees for the public services established in accordance with this Law. They may also apply fees for other municipal public services, provided that the amount thereof is proportionate to the production cost of such services. In this regard,

production cost shall be understood to be the cost that results from applying generally accepted accounting principles The State and other public sector entities shall pay the fees established for the public services provided by the municipalities and their enterprises. For this purpose, they will include the corresponding line item in their respective budgets.

Article 398 “Fees can be charged for the following services: ... d) water; ... k) sewerage....”

CHAPTER V On Water Fees and Rates

Article 407 “Municipalities and municipal water enterprises shall establish water fees as a function of the production cost of the service and of the payment capacity of the users”.

Article 409 “... Municipalities may charge appropriate fees for connections and reconnections, which fees shall not exceed the cost of the materials and labor used in producing such service.”

CHAPTER VI On Fees for Sewerage and Distribution

Article 411 “The municipalities shall establish, by means of an ordinance, the rates for sewerage and distribution, the amount of which may not exceed the cost of maintaining and operating the service, and the application of the fee shall be in accordance with the volume of water consumed by each user.”

5.3.1 Analysis and Observations

- Article 397 establishes the application of fees for the provision of public services, to be proportionate with production cost, with the clarification that such production cost results from the application of generally accepted accounting principles, as a result of which it is essential that the enterprise have installed and in operation a financial and cost accounting system. In addition, the article provides that both state and public sector entities are under the obligation to pay the fees established for the provision of public services.
- Article 398 refers specifically to charging fees for water distribution and sewerage services.
- The Law of Municipal Administration establishes, in Article 407, that the Municipalities and municipal enterprises shall set fees as a function both of production cost as well as of the payment capacity of the users, i.e., since it is a public service, the fee should not include a profit margin. However, it should include the amount required for depreciation of reappraised fixed assets in order

to avoid the decapitalization of the enterprises, so that surplus funds will be generated to replace depreciated assets.

- Article 409 establishes the application of fees that reflect the cost of connecting and reconnecting services.
- With regard to sewerage service, Article 411 establishes, as it does for the case of water distribution, that the amount of the sewerage fees may not exceed the cost of maintaining and operating such service. Another very important provision of this article is that the application of sewerage fees shall be in accordance with the volume of water consumed by each user, which is the most practical mechanism.

5.4 Title VIII: On the Special Improvement Assessment

Article 415 “The object of the special improvement assessment is the actual or presumptive benefit provided to urban real state as a result of the construction of any public work.”

Article 416 “The benefit referred to in the preceding Article exists when a property adjoins a public work, or is included within the area defined as being the area of benefit or influence, in accordance with an appropriate ordinance issued by the Municipal Council.”

Article 420 “The following special improvement assessments are established:... d) Sewerage works:... f) Construction and expansion of water works and systems:....”

Article 421 “The basis for this assessment shall be the cost of the respective work, prorated among the benefiting properties, in the form and in the proportion established herein.”

Article 427 “The total value of the sewerage works built in a municipality shall be paid entirely by the benefiting property owners, as follows: in new housing developments, the developers shall pay the entire cost, or shall implement for their own account the sewerage works that they require; in addition, they shall pay the amount or shall build for their own account the intercepting sewers that are necessary to connect with existing sewers.

In order to pay for the total cost of the existing sewers, or those to be built in the future, all ordinances governing housing developments shall establish an assessment per square meter of usable land.

In the case of the construction of new sewerage networks in developed areas, or the expansion of previously existing sewers, the total value

of the work shall be prorated in accordance with the cadastral value of the benefiting properties."

Articles Added Subsequent to Article 428 in Accordance with L72.R0441 dated 21-V-90

"Art... The special improvement assessment applicable to the construction and expansion of water works and systems shall be levied by the municipality ... in order to cover the total cost thereof proportionately to the assessed value of the benefiting properties, providing no other form of financing exists."

"Art... With regard to payment of the total cost of the reconstruction, expansion, operation and maintenance of water distribution and sewerage systems, the municipalities shall levy special improvement assessments, as well as compensatory fees for services as set forth herein.

The ordinances issued by the Municipal Councils with regard to the establishment of water fees and the special improvement assessments referred to in this title shall require only the favorable report of the Ministry of Finance and Public Credit and shall become effective upon their publication in the Official Registry."

Article 439 "Each municipality shall establish a fund with the proceeds of the improvement assessments that it collects, which it shall earmark exclusively for covering the construction cost of new reimbursable works, except for those amounts required to pay the cost of financial services as referred to in the following article"

Article 440 "The municipalities may issue municipal public debt bonds or contract other types of debts ... for use in setting up the fund referred to in the preceding Article, with proceeds of the improvement assessments to be set aside to cover the financial servicing of such debt."

5.4.1 Analysis and Observations

- Article 415 of the law provides a very clear definition of the special improvement assessments.

Article 416 stipulates that the benefit referred to in Article 415 is not only applicable to properties that adjoin a public work but also to those that fall within an area defined as being an area of benefit or influence.

- Article 420 of the law specifies the public works for which special improvement assessments are established and specifically identifies, in subparagraph d), sewerage works, and, in subparagraph f) water works.

- Article 421 states that the basis for the fee is the cost of the appropriate work prorated among the benefiting properties as determined by the law. For sewerage works, this is contained in Article 427, whereas for water works it is contained in the articles added after Article 428, in accordance with L72.RO441 dated 21-V-90.
- The law provides, in Article 439, that the proceeds of the special assessments shall be used to establish a fund, which shall be earmarked exclusively for construction of new reimbursable works. This is very important with regard to the continuation of public work construction programs.
- Article 440 empowers the municipalities to issue bonds or to contract debt for use in setting up the Fund referred to in Article 439.

5.5 Title IX: On Non-Tax Revenues

CHAPTER II On Non-tax Capital Revenues

Section 1 On Loans

Article 455 “Municipalities have the capacity to obligate themselves and to contract loans”

Article 457 “The following limitations are hereby established with regard to municipal public debt: a) loans for constituting municipal enterprises or implementing reimbursable public services shall have as their limitation the technical and financial feasibility of including in the corresponding fees or prices the amortization payments necessary to pay off the loan within the amortization period or within the period of duration of the service, ..., b) Loans for the construction of reimbursable public works by means of special improvement assessments shall have as their limitation the financial feasibility of paying off the loan within the established period with the proceeds of such contributions;”

5.5.1 Analysis and Observations

- Article 455 of the Law empowers municipalities to contract loans for the construction of public works.
- The limitations for municipal public debt are established in Article 457, which states, in the first place, that the prices or fees shall include the corresponding amortization of the loan obtained, whether for constituting the municipal enterprise or for implementing services, and, in the second place, that, with regard to loans earmarked for construction of reimbursable public works through the use of the special assessment mechanism, the limitation shall be the financial feasibility of

amortizing the loan entirely over the life of the loan and with the proceeds of the assessments, which will thus ensure the total recovery of the cost of the investment made.

Chapter 6

FINANCIAL PLAN FOR RECOVERING THE INVESTMENT AND RECURRING COSTS OF WATER DISTRIBUTION AND SEWERAGE SERVICES IN THE MUNICIPALITY OF MACHALA

The primary objective of the tariff policy is to set guidelines with regard to the standards and procedures to be followed in all of the various stages of the statistical-financial process in order to ascertain, as a final result, the amounts to be paid both by the users as well as by the beneficiaries of the services in exchange for their use and availability. Payment of such amounts is made on the basis of tariffs and fees, i.e., on the basis of a public price and an assessment.

Some aspects of the tariff policy, particularly those of a general nature, are set forth in the Law of Municipal Administration. Others must be established through the issuance of municipal ordinances and become effective within the appropriate jurisdiction. However, in both cases, they are obligatory both for the institutions that they govern as well as for those using the services.

6.1 Financial Self-sufficiency of the Entity or Enterprise Providing the Services

One of the primary goals and objectives of the enterprise providing the services should be to ensure the self-sustainability of those services, i.e., to obtain, on the basis of the proceeds of the operating revenues generated by the services themselves, total coverage for the expenses of administering, operating, maintaining, expanding and improving the services, as well as for the payment of principal and interest on loans taken on for the construction of new works.

This process is to be carried out as follows:

- a) Expenses involving administration, operation and maintenance, improvements and minor expansion of services are to be covered with the proceeds of fees and other operating revenues.
- b) The amount of the annual reserve for the depreciation of reappraised fixed assets in operation (at their current value, not their historical value) is to be covered with the proceeds of the special improvement assessments and other nonoperating revenues; the uncovered difference, if any, shall be covered by fees.
- c) The net revenues remaining after deducting operating, administrative, maintenance and debt service (principal and interest) expenses, together with the proceeds of loans and

minimum essential transfers from the government sector, shall be earmarked for public works construction programs.

6.2 Measurement of the Supply and Consumption of Water is Required

In order to ensure the availability of statistical and financial information and provide the basis for making planning decisions, it is absolutely essential to have available periodic records for the macro and micro measurement of water flow.

Records generated on the basis of macro meters will be received and analyzed in the operations area of the water distribution system and copies of the summary of results will be sent to the Planning and Project Area.

Records from micro meters will be used for billing and issuance of collection advice covering user consumption, following the appropriate analysis to be conducted by the Commercial Area. Copies of the billing summary will be sent to the Planning and Project Area for preparation of consumption bar graphs and statistical analysis.

Without macro and micro measurements, it would be impossible to achieve the objectives of establishing equitable fees for consumption, reducing water waste and ensuring the availability of an appropriate planning system for preparing and programming new projects and achieving financial self-sufficiency.

6.3 Definition of the Users and Beneficiaries of the Services

The tariff policy establishes, as one of several requirements, the need for equitableness, as a result of which the assessments to be levied for recovering the total costs (both investment and recurring) involved in the provision of water distribution and sewerage services will be distributed equitably among the USERS of those services, i.e., those who are connected directly to the system by means of water taps, connections or sewerage outlets, and the BENEFICIARIES, i.e., those who, although they do not have water taps, connections or sewerage outlets, receive the benefit or surplus value derived from the existence of water distribution or sewerage systems. Accordingly, distribution of assessments between users and beneficiaries should be proportionate to the costs and expenditures required for them to make use of the services and enjoy the benefits thereof.

In accordance with the above, it is felt that the proceeds of the fees generated from the use of the service provided constitute a portion of the necessary revenues and that the remainder will come from the fees charged to the benefiting properties, including those for future housing developments as a function of construction cost, as provided in the Law of Municipal Administration.

6.4 Methodology for Estimating the Resources That Need to be Obtained from Fees for Water Distribution and Sewerage Services

The amount of the resources necessary, which in turn will constitute the basis for developing the tariff structure in accordance with the provisions of the law, will be equal to the sum of the following expenses:

- Operating Expenses
- Maintenance Expenses
- Administrative Expenses
- Expenses Involving Minor Expansions and Improvements

6.5 Methodology for Estimating the Resources Necessary for Investments in Works and/or Payment of Debt Service

Investments in works shall be those established in the budgets for construction programs. Because of the time involved in designing the plans, the works will be implemented in stages. Investments to be made during each stage represent the sum of the amounts budgeted for each project during each successive year, which will be covered in part by the enterprise with its own funds, as well as by funds provided through loans granted by national or international banking institutions.

The amount of annual funds necessary will represent the sum of annual programmed construction costs plus amounts required for payment of capital and interest on loans, if any, and will consist of the following revenue items:

- Net Operating Revenue (positive balances)
- Reserves for Depreciation
- Special Improvement Assessments
- Minimum Essential Transfers
- Proceeds of Loans Contracted with National and International Financial Institutions

The complete step-by-step methodology for calculating the funds that need to be obtained from fees and the funds necessary for investment in construction projects and/or payment of debt service can be found in Annex No. 8, "Methodology for the Financial Analysis of Projects."

6.6 Premises to be Taken Into Account When Designing the Tariff Structure for the Water Distribution Service

Design of the tariff structure for water distribution service will be based on two essential figures: the amount of economic resources necessary to provide the service and the volume of water actually consumed by the users of the system. These two amounts should provide the most accurate approximation of the costs incurred, as well as of actual consumption.

The tariff assessment will be of a differential type, which should be established in the appropriate ordinance, with levels of not less than 50 percent of the average cost for low-volume consumers (low) of a domestic type, and no greater than 300 percent of the average cost for high-volume consumers (high) of the same domestic type. In addition, the tariff will consist of two components, the first of which will be the BASIC CHARGE, to which will be assigned a fixed volume of consumption, and the other will be the ADDITIONAL CHARGE, which will be applicable to consumption above that included in the basic charge. Each of these two charges will incorporate a progressively increasing order of values.

Water distribution service will be classified in accordance with the use given to the water. Such classification will include domestic, commercial, industrial and government categories, plus the category mentioned in the Law of Municipal Administration that involves consumption by social welfare institutions and institutions providing free education, for which the tariff to be applied will be 50 percent of the standard tariff.

The distribution of funds between domestic, commercial and industrial consumption shall be made on the basis of an average differential amount to be established with the aid of incremental factors to be applied to each individual category.

Distribution of the necessary resources assigned to the each class of consumption will be made on the basis of blocks of consumption designed as a function of the concentration of users observed in the corresponding consumption bar graphs. A concerted effort will be made to avoid exceeding six (6) blocks in each class of consumption. In the first block, an amount for minimal consumption will be set at a level not greater than 50 percent of the entire range, to which a fixed charge will apply. In subsequent blocks, consumption will be equal to the lower value of the range less one (1), plus the additional consumption corresponding to the difference between the constant values within the respective range. Each block will be affected by a differential coefficient for basic consumption as well as by a differential coefficient for additional consumption.

The tariffs to be applied to both basic consumption and additional consumption will be obtained by dividing the amount of resources assigned to each class of consumption and the sum of consumption recorded within the definitions of basic consumption and additional consumption, with care to be taken that the transition values of the tariffs for basic consumption between consecutive blocks are of equal amounts.

6.7 Premises to be Taken Into Account When Establishing Tariffs for Sewerage Service

In accordance with the provisions of Article 411 of the Law of Municipal Administration, application of the sewerage service tariff will be as a function of the consumption of water recorded by each respective user.

In determining the sewerage rate, efforts will be made to achieve financial self-sufficiency as regards the costs of administration, operation, depreciation, maintenance and small expansions and improvements.

The level of resources necessary to cover the cost of providing sewerage services, as well as those required for investment in new works, will be established separately from the amount of resources required in the case of water, in accordance with the breakdown provided in subparagraphs 6.4 and 6.5 above.

The simplest way to establish a fair and equitable tariff for sewerage service is to relate the latter to the water consumption recorded for the same property.

When water consumption is recorded monthly by means of water meters installed in the service lines, this method is more convenient. The tariff that is applied to the consumption of water is of a differential type and not a fixed amount. Accordingly, it is advisable to relate it directly to the volume of water consumed, although it is possible to relate it to the total amount invoiced.

The tariff indicated is the result of a process of distributing the costs included in the amount of resources necessary to provide water distribution service. Using the same criterion, it is possible to assume that, from a proportionate share of that amount, it is possible to obtain the resources required to provide sewerage services. In this way, by establishing a proportion between the resources necessary for water distribution service and those required for sewerage service, it will be possible to obtain a percentage which, when applied to the current level of collections generated by the application of the water tariff, will make it possible to determine the resources necessary to provide sewerage service. However, this percentage should be reviewed yearly.

Tariffs for sewerage services should be included in the same invoice covering water consumption.

6.8 Special Improvement Assessments

The level of a rate constitutes the levy assessed to the beneficiaries of public works that are built to provide a benefit to the properties located within the corresponding area of influence.

Water distribution and sewerage systems built for communities constitute public works the entire value of which can be covered through the so-called Special Improvement Assessment, as set forth in the Law of Municipal Administration.

However, in each case, i.e., for each system, it will be necessary for the appropriate municipal council to issue an ordinance establishing the total value of the works to be recovered on the basis of the assessment, as well as the amount of the rate and the way in which it is to be applied.

Revenues from the special improvement assessments, when applied to water distribution and sewerage systems, represent own sources of income since they originate in the benefits provided to the properties by the new systems being installed. Accordingly, they must be used exclusively to finance investments in public work projects or to pay off debts contracted for that purpose.

The rates to be applied by the enterprise as regards large and small sewers, as well as for the primary and secondary water distribution networks, should be updated periodically as a function of the process of updating and reappraising the corresponding fixed assets.

New housing developments, in addition to being responsible for paying the total cost of internal works and connections to the city distribution network, will pay the total cost of the new works constructed, or the reconstruction of the existing works, prorated on the basis of the amount of capacity used.

6.8.1 Establishment of Project-Specific Rates to Be Applied in the Case of Water Distribution and Sewerage Services

In order to establish, on an independent basis, the level of the rate applicable to water distribution and sewerage services, it will be necessary first to identify the projects that are to be subject to the assessment process, together with the total amount of the investment made and, secondly, to establish the physical characteristics — area and frontage — of the properties that will benefit directly, since water distribution service and sewerage service are provided only for those properties fronting on streets where such networks have been installed.

If the assessment is being established for the first time with regard to a particular construction project, the amount to be distributed will be equal to the current value of the project. However, if the work has previously been placed into service and if a prior special improvement assessment has already been applied to it, the procedure will be different, since it will be necessary to determine the current value of the work as a function of the depreciation to which it has been subject during the years in which it is been in service, the appropriate reappraisal, the amortization of principal based on payments of assessments made thus far by users and, lastly, the value of any new works that may have been added to the system during the period in question.

Likewise, the areas receiving the benefit of the work should be updated by incorporating all areas and sectors to which service has been extended during the same period of time.

The quotient between the updated value of the work and the updated area of benefit will constitute the new updated rate to be applied to beneficiaries.

6.8.2 Collection of Fees Covering Water and Sewerage Works

The procedure for collecting the special improvement assessments applied to the benefits derived from water distribution and sewerage systems consists in taxing properties as a function of the area of land and four different rates, i.e., one for the primary network, another for any secondary networks, and two for sewerage (one for large sewers and another for secondary sewerage networks).

6.9 Procedures for Updating Tariffs and Fees

As a result of the inflationary process currently existing in the country, it becomes necessary to systematically apply mechanisms for updating tariffs and fees for collecting the special improvement assessments in order to make it possible to achieve total recovery of both investment and recurring costs in real terms.

6.9.1 Updating of Tariffs

It should be established in the appropriate ordinance that the average cost of the tariffs is to be readjusted on a timely basis, by means of a mathematical formula or polynomial equation that should include the primary cost concepts (salaries, wages and benefits, electricity and chemicals, with all other items of minor importance to be lumped together in a single category).

The financial information necessary to effect this adjustment should be provided by the Accounting Department for each of the various cost concepts.

The promptness and frequency with which the water tariff is to be updated should be established by the Planning Area of the enterprise, based on the difference resulting from a comparison of the current average cost and the prior average cost, calculated in accordance with the formula. For this purpose, a monthly control should be kept of such variations, the amounts of which should be graphed in order to show trends. It is recommended that the adjustments be made on a monthly basis rather than waiting for several months, because in the latter case the impact on users is greater and more burdensome than if it is done on a monthly basis.

6.9.2 Updating of Fees

Updating of the fees levied for special improvement assessments, the basic components of which are total cost of the construction project and the total area of the benefiting properties, should be conducted as a function of the increase that is to be allotted to the basic terms as a result of the reappraisal of fixed assets due to system modifications, expansion or reconstruction, or inflation or devaluation, as applicable, as well as the modification of the benefiting area.

6.10 User Record, Meter Reading, Billing and Collections

This is the critical process within the procedure for achieving self-financing with regard to the expenses involved in service provision, as a result of which they should be programmed, organized, managed and operated with the greatest possible degree of efficiency.

The schedule of users constitutes the reference and information center in which each of the water distribution and sewerage service connections, whether actually in service or about to be placed in service, should be recorded in detail.

The process of preparing the meter reading lists, the work involved in recording the meter readings, the verification of such records, the issuance of the corresponding bills and the collection of the amounts due should take place within a period of 30 days, which constitutes one collection cycle, although actually it involves a period of 20 working days.

6.11 Increase in the Number of Users

As the water distribution and sewerage system networks are extended and their capacity increased, a program will be launched with a view toward incorporating, as users, all those properties benefiting from such networks.

In order to increase the feasibility of such a program, a system will be established that will facilitate payment of the increased cost of connections, together with the amounts of the special improvement assessments, by potential new users that are able to demonstrate that they are unable to pay such amounts on a cash basis, and in this way avoid clandestine users.

6.12 Summary of the Financial Plan for Recovering Investment and Recurrent Costs Involved in Providing Water Distribution and Sewerage Services

Cost or Expenditure Concepts	Origin of Resources for Payment or Recovery	Mechanism for Recovering Costs and Expenditures	Legal Basis for Application
<p>I. Investments in water infrastructure projects.</p> <p>1.1 Capture 1.2 Conveyance 1.3 Treatment</p> <p>II. Investments in water distribution projects.</p> <p>2.1 Primary or principal networks. 2.2 Storage tanks.</p>	<ul style="list-style-type: none"> - Positive balances from operations and reserve for depreciation when not earmarked for payment of debt service. - Special improvement assessment. - National and foreign credit funds. - Minimum essential transfers. 	<ul style="list-style-type: none"> - Special improvement assessment. - Readjustment of tariffs applicable to high-volume consumers (more than 50 m³/month) in order to cover the subsidies required in a transparent fashion. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 420, paragraph f, and the ordinance of the appropriate municipal council. - Ordinance of the appropriate municipal council.
<p>2.3 Secondary networks in neighborhoods.</p>	<ul style="list-style-type: none"> - Paid for or built by urban developers. - Special improvement assessment when there is no responsible urban developer (rotating fund). - Credit resources. 	<ul style="list-style-type: none"> - Special improvement assessment. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 420, paragraph f. - Ordinance of the appropriate municipal council and Article 439 of the Law of Municipal Administration.
<p>III. Investments in water connections.</p> <p>3.1 Connections 3.2 Meters</p>	<ul style="list-style-type: none"> - Paid for directly by users at actual cost. 	<ul style="list-style-type: none"> - Fees. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 409.
<p>IV. Investments in sewerage works.</p>	<ul style="list-style-type: none"> - Same origin as for investments in water distribution for cost categories I and II, but in this case for sewerage. 	<ul style="list-style-type: none"> - Special improvements assessment. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 420, paragraph d.
<p>4.3 Sewerage networks in neighborhoods.</p>	<ul style="list-style-type: none"> - Same origin as for water investments in number 2.3. 	<ul style="list-style-type: none"> - Special improvements assessment. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 427.

Cost or Expenditure Concepts	Origin of Resources for Payment or Recovery	Mechanism for Recovering Costs and Expenditures	Legal Basis for Application
<p>V. Investments in expansions and improvements.</p> <p>5.1 Buildings and land 5.2 Vehicles and accessories 5.3 Office equipment and furniture 5.4 General service equipment 5.5 Radio equipment</p>	<ul style="list-style-type: none"> - Reserves for depreciation. 	<ul style="list-style-type: none"> - Service tariff, which should include asset depreciation. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Articles 127, 210 and 407, and ordinance of the appropriate municipal council in the case of water distribution, and Articles 197, 210 and 411 and ordinance of the appropriate municipal council in the case of sewerage
<p>VI. Costs and expenses of operation, maintenance and administration.</p> <p>6.1 Salaries, wages and employee benefits 6.2 Maintenance and repair of buildings, office equipment, transportation equipment, pumping equipment, electrical equipment and others 6.3 Materials and tools 6.4 Electricity 6.5 Chemicals 6.6 Fuel and lubricants 6.7 Stationary and office supplies 6.8 General expenses 6.9 Other expenses</p>	<ul style="list-style-type: none"> - Tariffs for service provision. - Other operating revenues. 	<ul style="list-style-type: none"> - Tariff for service provision. 	<ul style="list-style-type: none"> - Law of Municipal Administration, Article 407, in the case of water distribution, and article 411 and ordinance of the appropriate municipal council in the case of sewerage
<p>VII. Debt service.</p>	<ul style="list-style-type: none"> - Positive operating results and reserve for depreciation. - Special improvement assessment 	<ul style="list-style-type: none"> - Tariffs for service provision. - Special improvement assessment. 	<ul style="list-style-type: none"> - Law of Municipal Administration, same articles as for item V and in addition Article 457 and the ordinance of the appropriate municipal council
<p>VIII. Depreciation of reappraised fixed assets.</p>	<ul style="list-style-type: none"> - Tariffs for service provision. 	<ul style="list-style-type: none"> - Tariffs for service provision 	<ul style="list-style-type: none"> - Law of Municipal Administration, same articles as for item V and ordinance of the appropriate municipal council

Chapter 7

PROGRAM OF INSTITUTIONAL DEVELOPMENT TO SUPPORT THE CREATION OF THE MACHALA MUNICIPAL WATER AND SEWERAGE ENTERPRISE

7.1 Introduction

The primary objective of institutions charged with providing water distribution and/or sewerage services is to provide them with appropriate degrees of quality, quantity and continuity. However, such services can be provided on the basis of a wide array of objectives, among which the following are basic:

- To provide a public service to which all of the inhabitants of the municipality have the right of access.
- To contribute to the establishment of a framework of social justice within which people will be able to meet their basic needs in a decent fashion and at affordable rates.
- To constitute a self-sufficient enterprise, framed within technical, administrative and financial parameters, such that it will be an effective instrument of government, operating without diverting resources from priority investments in other areas.

In order to fulfill these objectives, it will be necessary to establish an organization with appropriately structured objectives, goals, policies and procedures that will result in an institution with the ability to provide efficient and effective services and prepared to continue to function on the basis of the service that it provides, the flexibility and soundness of its organizational structure, and the benefits that it generates.

An **institutional development program** is a process of gradual structuring or change, planned and permanent, that will enable the organization to achieve self-sufficiency in financial, administrative and technical matters and thus fulfill its objectives within the environment in which it operates and to which it provides its services.

It is obvious that institutional development must take place on the basis of the assigned functions and objectives of the enterprise. In addition, it must be remembered that, as a rule, water resources are limited, as a result of which one of the priority objectives should be to optimize water use through appropriate controls.

Accordingly, it is suggested that attention be focused on:

- a) Regularizing services with regard to quality, quantity and continuity.
- b) Keeping the facilities operating efficiently.
- c) Controlling and measuring the volumes of water generated.

- d) Keeping accurate records of all system users, including both those to whom service is currently being provided as well as those requesting service in the future.
- e) Measuring the volume consumed by each user in order to apply equitable fees.
- f) Establishing effective systems to ensure that proper attention is given to the user, who is both a customer as well as the *raison d'être* of the enterprise.
- g) Ensuring the availability of all necessary logistic support in the areas of administration, accounting, warehouses and human resources, in order to maintain the quality of services and provide support to the various areas of the enterprise.
- h) Maintaining appropriate communications with users, which will enable the enterprise to keep users properly informed and create a favorable environment.

Institutional development must begin with an initial definition of organizational design and establish specific objectives to be achieved, one of which should be precisely that of creating within the organization the capacity to continue to develop uninterruptedly so that it will increasingly become an institution achieving its objectives in every sense, within its own particular environment.

7.2 Bases for the Institutional Development Program

In order to implement a complete institutional development program, it will be necessary to begin with an assessment that will make it possible to ascertain the current status of the system and at the same time conduct the study for the creation of the municipal enterprise.

The assessment will make it possible to obtain a clear picture of needs, which will in turn make it possible to develop a specific strategy for program implementation.

The assessment should make it possible to define the following:

- Immediate actions, and
- Short-term programs.

7.2.1 Immediate Actions

These are actions that can and must be carried out without further delay in order to bring about an immediate improvement in service and enhance the institutional image in the public eye.

Examples of this type of action include the following:

- Obtaining the ordinance from the Municipal Council creating the enterprise.
Acquiring a building in which to set up offices.

- Establishing a provisional system of tariffs while the meters are being installed, and beginning a process of monthly billing and collection, following the creation of a service marketing office.

7.2.2 Short-Term Programs

Such programs are necessary in order to ensure the sound institutional development of the enterprise, in the form of a structured plan, in accordance with the response and participation capability of the institution.

This way of approaching institutional development makes it possible to expand the horizons of the program, to consider not only the analysis, design and implementation of systems, but also the programs and activities necessary to ensure that the implementation of those systems will provide the expected results.

7.2.2.1 Cadastral Survey Program or User Census

This program will make it possible to ascertain the size and make-up of the service consumer market, i.e., to ascertain:

- The total number of domestic users
- The total number of commercial users
- The total number of industrial users
- The total number of public users
- The number of actual users (those already connected to the system)
- The number of feasible users (those not yet connected but equipped with the infrastructure necessary to enable service to be provided within a very short period of time).
- The number of potential users (those included in network expansion plans).

Other benefits of the program will include:

- The detection and correction of anomalies in the cadastral survey of users.
- The establishment of efficient meter reading routes once a measurement program has been established.
- The detection of other anomalies, such as clandestine users.

7.2.2.2 Program for Implementing the Newly Designed Accounting System

The purpose of this program is to begin the operations of the enterprise on the basis of complete and accurate accounting information.

The most important benefits to be obtained from this program are as follows:

- It will provide appropriate, correct and timely financial information that can be used as a management tool in decision-making.
- It will provide correct information that can then be fed into the accounting system to be implemented as a part of the institutional development program.
- It will facilitate annual audits.

7.2.2.3 Program for Regularizing Delinquent Water Service Users

This program is aimed at normalizing to the extent possible outstanding balances due from water service users.

Actually, it is a program that is complementary to the accounting program to be installed and is necessary in order to determine which outstanding balances are uncollectible due to the time they have been outstanding, or the fact that the users never received water, or that the users no longer exist, as a result of which accounts receivable will be culled in order to reflect realistic amounts.

7.2.2.4 Program for Quantifying the Water Produced

This program is aimed at determining the volumes of water being obtained from capture sources.

Having this information available will make it possible to ascertain future investment needs so that installed capacity will not be outstripped by demand.

Other benefits to be obtained include the following:

- In addition to the information obtained from the user census, additional information will be generated to quantify daily production per inhabitant.
- It will be possible to ascertain volumes of water not accounted for on the records of the enterprise as well as physical losses of water, through a comparison with volumes of water billed.
- It will be possible to determine, once the accounting system has been installed, the unit production cost for each source of supply.

7.2.2.5 Network Survey Program

The rationale for this program lies in the lack of updated drawings of system facilities. The most important benefits to be obtained from its implementation are as follows:

- It will provide a solid basis for the daily operation of the system, which in turn will make it possible to ensure better service distribution and more efficient attention to any problems of an operating nature as might arise (leaks, lack of water, new user feasibility, etc.).
- This information will serve as the basis for determining the amount of resources invested in water works.
- The updated drawings thus obtained will form the basis for implementing the meter installation and water loss control programs to be established as a part of the institutional development program.

7.2.2.6 Visible Leak Control Program

Despite the fact that it is currently not possible to determine with any degree of precision the volume of water lost to leaks, it will be necessary to carry out actions aimed at minimizing such leaks.

This will produce a benefit in the form of a decrease in the operating costs of the enterprise and an increase in the volumes of water delivered to the consumer public.

7.2.2.7 Equipment, Machinery and Vehicle Maintenance Program

The purpose of actions to be undertaken as part of this program is to keep the equipment, machinery and vehicles belonging to the enterprise in proper operating conditions. This will lead to an improvement in the operating efficiency of all systems by minimizing down time caused by breakdowns.

7.3 Systems Analysis, Design and Implementation

As part of the institutional development program and in order to take advantage of and conserve the benefits provided by the short-term programs to be installed at the beginning of the institutional development process, it will be necessary to proceed to modify the working methods used by the municipality with regard to service provision.

This phase of the institutional development program begins with a study of the methods and procedures used by the municipality to carry out the functions of each of the organizational systems.

As a result of this analysis, it will be possible to identify the changes required to increase efficiency in institutional performance. Such changes, once designed and approved by the appropriate authorities, should be placed into operation, i.e., implemented as part of the routine working methodology.

7.4 Training

In order to ensure that the improvements to be generated on a continuous basis by the institutional development program within the internal environment of the organization are assimilated by the staff, it will be necessary to adopt implementation strategies that include training courses and visits to working enterprises. Such courses will be necessary in order to provide staff members with both general and specific knowledge that is appropriate with regard to the new functions they are to perform.

7.5 Equipment

Frequently, during either the assessment or the process of systems analysis, it will be found that an important element for achieving institutional efficiency involves providing the various areas of the organization with the appropriate equipment for properly carrying out their functions.

Once the changes or systems to be implemented have been defined, they should include the procurement of equipment aimed at facilitating the proper implementation of activities.

7.6 Orchestration of the Institutional Development Program

When speaking of the orchestration of a program of this nature, it is important to stress the primary objective of the enterprise, which is to provide services of the quality, in the quantity and with the continuity required by the population, as well as to recover, equitably and efficiently, the costs of such services.

Orchestration of the program should be based on the critical activities and situations of the enterprise, which, as has already been mentioned, should be identified during the assessment. The latter, in turn, should be conducted by professionals having experience in the operation and administration of water distribution and sewerage utilities.

All organizations find themselves in a constant process of evolution, but in order for such evolution to be properly considered to be institutional development, it should be based on a known starting point, as defined in the assessment, and have specific objectives to attain, one of which should be, precisely, to create within the organization the capability to continue to develop uninterruptedly so that it will at all times be able to achieve its objectives in every sense.

However, none of the above is valid unless there exists a commitment at the highest levels to carry out the institutional development program.

Institutional development programs, water loss reduction and control programs or similar programs are often imposed as a precondition for loans or investments. In these cases, the enterprises carry out the programs moved only by the need to fulfill a requirement, and thus ultimately obtain little or no use from them. The decision of the Mayor and of the general management staff is essential for obtaining positive results. Without such an attitude and without the firm decision of the appropriate authorities of the enterprise, any attempt at institutional development will be an exercise in futility.

In addition, it is necessary to insist on, and not lose sight of, the fact that institutional development will occur only if the process has been adopted as an initiative of the enterprise itself. In no case can it be a process imposed from outside or one that can be implemented without the intervention of the appropriate personnel. The institutional development of each enterprise must be embraced as its own and originate within the enterprise itself. If not, it will be rejected just the way any external element is rejected in a living organization. The participation of paid or nonremunerated consultants will be successful only if there exists within the enterprise the necessary agents of change to facilitate the process.

The result of the theories that have been considered, in conjunction with experience, is that the first step of the program should be an assessment from which a structured program would be derived in accordance with the response and participation capability of the staff of the organization.

7.7 Strategy

As previously indicated, in order to carry out a complete program of institutional development, it will be necessary to conduct, in an initial phase, an assessment from which the immediate and short-term activities required to ensure the sound institutional development of the enterprise will be derived. This will be in the form of a structured program in accordance with the response and participation capability of the staff of the enterprise and the need for external support.

The program should include, as a result of the assessment, the activities required for carrying out each of a series of specific projects, as well as the scheduling of those projects, thus making it possible, if so required, to contract, at the proper time and with the appropriate consultant, the performance of the required work, in accordance with technical priorities, the programming of financial resources and the availability of qualified human resources within the enterprise, in a process the duration of which will be determined by the characteristics of the enterprise.

This way of approaching institutional development makes it possible to expand the horizons of the program and includes not only systems analysis, design and implementation and the

implementation of certain complementary projects as adjunct components, but also (when necessary and not already present within the enterprise) activities such as the following:

- Creation or updating of technical inventories of networks and equipment.
- Installation of an accounting system.
- Regularization of the portfolio of debit balance users.
- Creation or updating of the user census.
- Procurement of equipment such as macro and micro meters, vehicles, computers, etc.
- Training programs and technical visits for employees and officers of the enterprise.

Many of the projects that make up a program of institutional development require prior work to be carried out in order to obtain from the project the expected results. Thus, with regard to the implementation of a billing system, the result is conditioned on the existence of an accurate and up-to-date schedule of users that will often require a user census to be taken. With regard to the implementation of a pitometry program, it will be necessary to ensure the availability of complete and up-to-date drawings of the water distribution networks and valves in optimum operating conditions, which may in turn require the prior implementation of a valve repair, substitution and installation program, etc. As a rule, consultants leave entirely up to the enterprise the implementation of such prior work and condition the success of the institutional development program on proper compliance in this regard.

The strategy proposed for carrying out the institutional development program focuses on three basic points:

The Implementation of an In-depth Assessment. This assessment should lead to the development of a document that would include the following:

- a) The current status of water distribution and sewerage systems in the municipality of Machala.
- b) Actions that should be taken immediately.
- c) A listing of specific projects that should be implemented over the short term as part of the institutional development program of the enterprise.
- d) A general work plan for the institutional development program.

The Creation of an Area Responsible for Coordinating and Supervising the Institutional Development Program or, Alternatively, the Contracting of a Consultant to Perform This Function.

The contracting of specific consultants to provide support in carrying out each of the various projects of the program that so require, or seeking the advisory services of the EMAP-Q based on its prior experience in institutional development in many of the various areas involved in commercial management and financial administration.

It is this strategy that will make it possible to ensure the success of the institutional development program as an element to support the creation of the Machala Municipal Water and Sewerage Enterprise.

Chapter 8

CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses conducted with regard to the items stipulated in the Scope of Work, the following conclusions and recommendations are submitted:

- The image of the municipality in the public eye has deteriorated as a result of its practically nonexistent performance of the past, especially as regards water distribution and sewerage services. Also contributing to this situation is the dirty and abandoned aspect presented by the interior of the building and facilities, the unfriendly attitude of its employees and the dissatisfaction of residents with other public services.
- In order for there to be any improvement in the Water and Sanitation Departments of the municipality with regard to accounting and budget systems and financial administration in general, as well as in the implementation of appropriate cost recovery methods and procedures, it will be essential for the current structure of the Financial Department to be modified in its entirety, along with its procedures and methods, which would require a considerable amount of time and involve high levels of costs.
- Since the current municipal administration, headed by the Mayor, is wholly committed to providing improved water and sewerage services, it is essential for it to drastically improve its current image through the creation of the Machala Municipal Water and Sewerage Enterprise.
- Municipal authorities should take all steps and carry out all activities required to bring about the prompt and timely creation of the Municipal Water and Sewerage Enterprise. To achieve this objective, it will be necessary, among other things, to do the following:
 - Draft an ordinance creating the enterprise and obtain the approval of the Municipal Council.
 - Study the physical location of the enterprise, which should be housed separately from the municipal building, in order to provide a completely new image to the two services.
 - Request technical assistance for designing the organizational structure, including all of its various positions, functions and responsibilities.
 - Appropriate the land and obtain the resources necessary for the design and construction of the facilities.
 - Request advisory assistance for implementing the proposed institutional development program described in Chapter 7.

- Visit the EMAP-Q and ETAPA-Cuenca in order to observe their organizational structures and receive training in their marketing and financial administration systems.
- Request technical assistance for designing the marketing and financial administration systems (this could be done with assistance from the personnel from the EMAP-Q that designed, developed and placed into operation the above-mentioned systems.
- Prepare both the initial budget as well as the opening balance sheet for operations.
- In order to recapture the trust and credibility of the public, implementation of the above-listed activities should be accelerated. In conjunction with this, a contest should be drawn up, with full and open participation, for designing a logo for the enterprise.
- Request technical assistance for conducting a study to detect, control and correct leaks and place it into operation once finished.
- Request advisory assistance for preparing a study to determine the type of water meters to be used in Machala.
- Institute a procedure for issuing bills for payment of water fees on a monthly basis, as the current procedure, which is performed annually, is too inefficient.
- Conduct the appropriate studies for determining the actual costs of water connections and sewerage installation.
- Request advisory assistance for conducting the study of water and sewerage tariffs, both before and after installation of the water meters.
- Implement the schedule of users and networks, with regard to both water and sewerage service, and then computerize it.
- Cull the portfolio of debit balance users and take decisive action to collect any outstanding balances.
- It was determined that extreme poverty does not exist in Machala, as the salary level prevailing in the lower socio-economic class is above the official minimum. Rather, poverty is reflected in the lack of public services.
- After estimating and projecting investment costs as well as the costs of operation, maintenance, administration, depreciation and block water supply for the Regional Plant, and after analyzing cost recovery mechanisms and the payment capacity of users, the following conclusions were reached:
- Fifty percent of the cost of investments in meters, networks, tanks and pressure filter treatment plants could be financed, on a reimbursable credit basis, through the Banco del Estado-administered Municipal Development Program (PDM), which receives funds from IDB and World Bank loans as well as national counterpart funds through the Municipal Investment Fund (FIM). Twenty percent could be financed through nonreimbursable contributions from the Municipal Investment Fund (FIM), and the

remaining 30 percent could be financed with own resources to be provided through the recovery of the cost of meters and from special improvement assessments. However, it is felt that Machala will be able to pay for the amortization of capitalized interest during the investment period only through the year 2001, and that from that time on it will require a transfer to cover such payments. If this is not possible, then interest should not be capitalized but rather should be absorbed by the FIM, with the remaining funds to be earmarked for sewerage works. In this case, the amount of the average monthly fee per benefiting user would be as follows:

a) Cost of Meters

The estimated amount to be paid by each user per installed meter, at current prices, would be S/.134,750 which, when financed over a 24-month period at an annual rate of interest of 36 percent, gives a monthly payment of S/.7,960, or US\$4.20.

b) Cost of Water System Expansion and Improvement Works

Based on an estimate that the number of properties to benefit from these works will total 60,000, the average amount to be paid by each through a special improvement assessment (in accordance with the provisions of the Law of Municipal Administration) would be S/.362,471 which, over a period of 36 months at an annual interest rate of 36 percent gives an average monthly payment for the lower class population of S/.8,250, or US\$4.34.

c) Costs of Operation, Maintenance, Administration, Depreciation and Block Water Supply

At current prices, in the year that these costs are highest as a result of the start-up of the entire new system, average monthly payment per user is S/.9,989, which would cover all costs in their entirety. For users in the lower class, an estimated consumption of 20 m³/month would be equivalent to no more than one day's minimum wage, which is currently set at S/.5,790, or US\$3.05.

To summarize, the total monthly payment required for provision of adequate water service to a lower class user at current prices would be as follows:

Meter (24 months)	S/. 8,250	US\$ 4.20
Special Improvement Assessment (36 months)	S/. 7,790	US\$ 4.34
Monthly Payment of Water Tariff	S/. <u>5,790</u>	US\$ <u>3.05</u>
MONTHLY TOTAL	S/.22,000	US\$11.59

This amount represents 12.67 percent of the monthly minimum wage, or almost four days' minimum wage, an amount considered to be in accordance with the payment capacity of the lower class population of Machala.

The monthly payment of S/.22,000 is equivalent to purchasing the following articles, which are not basic staples and are considered to be harmful to health:

6 beers at S/.1,000	=	S/. 6,000
5 packs of cigarettes at S/.1,700	=	S/. 8,500
3 liters of Coca-Cola at S/.2,500	=	S/. <u>7,500</u>
		S/.22,000

- Adopt a financial scheme as detailed in Chapter 6.
- In order for the municipality of Machala to improve its water distribution and sewerage services, it should comply with the terms of the program and schedule of activities described on the following pages of this summary.

PROGRAMMING AND SCHEDULE OF ACTIVITIES AIMED AT IMPROVING WATER DISTRIBUTION AND SEWERAGE SERVICES IN THE MUNICIPALITY OF MACHALA

Described below are the activities to be carried out and their implementation period, in order to achieve the objectives proposed by the Municipal Mayor with regard to the improvement of water and sewerage systems:

No.	Activity	Responsible Party	Period
1.	Preparation of the ordinance creating the municipal enterprise.	Mayor	July 93- Aug. 93
2.	Approval of the ordinance by the municipal council.	Mayor	Sep. 93- Oct. 93
3.	Appropriation of the land for construction of facilities.	Mayor	Sep. 93- Oct. 93
4.	Obtain technical assistance for designing the organizational structure, which should also include positions and functions	Planning and Project Department	Nov. 93- Jan. 94
5.	Design the facilities for the enterprise and develop a construction plan.	Planning and Project Department	Nov. 93- June 94
6.	Obtain the resources necessary to build the facilities.	Mayor	Jan. 94- Feb. 94
7.	Obtain technical assistance to determine what types of meters to use.	Planning and Project Department	Jan. 94- Mar. 94
8.	Obtain advisory assistance for the water tariff study.	Water Department	Oct. 94- Nov. 94
9.	Obtain advisory assistance for implementing the institutional development program.	Mayor	Jan. 94- Dec. 95

No.	Activity	Responsible Party	Period
10.	Obtain technical assistance for designing and implementing the marketing and financial administration systems.	Mayor	Jan. 94- June 94
11.	Draw up the schedule of users, networks and connections	Water Department	Jan. 94- Mar. 94
12.	Cull the portfolio of debit balance users and make concerted efforts to collect amounts outstanding.	Financial Department	Mar. 94- June 94
13.	Prepare and develop the feasibility study for the water project and the ordinance establishing the special improvement assessment.	Mayor	Aug. 93- Oct. 94
14.	Start-up of operations at the enterprise.	Mayor	Aug. 94
15.	Obtain technical assistance for conducting the study to detect, control and correct leaks.	Mayor	Oct. 93- Dec. 93
16.	Conduct and apply the studies for determining the real costs of water connections	Water Department	Sep. 93- Oct. 93
17.	Conduct and apply the studies for determining the real costs of sewerage installation.	Sewerage Section	Sep. 93- Oct. 93
18.	Obtain advisory assistance for determining the costs of sewerage service and establishment of the tariff.	Sewerage Section	Jan. 94- Feb. 94
19.	Implement the marketing and financial administration systems.	Mayor	May 94- Aug. 94
20.	Issue revised and corrected water bills for 1993.	Financial Department	Aug. 93 Oct. 93

A N N E X N O . 1

**COST RECOVERY AND FINANCIAL MANAGEMENT IMPROVEMENT
WORK PLAN**

WORK PLAN

COST RECOVERY AND FINANCIAL MANAGEMENT IMPROVEMENT

In order to achieve the objectives established for this consulting assignment, the following General Work Plan was drawn up:

DATE	ACTIVITIES
<u>First Week</u>	<u>Monday, June 14 through Saturday, June 19</u>
Monday, June 14th	■ Discussions of objectives with AID, planning meeting, and development of the Work Plan. Meeting with IEOS-Quito authorities.
Tuesday, June 15th	■ Trip by Jorge Infante to Machala and preliminary meeting with the Director of the Office of Planning and Projects at the municipality.
Wednesday, June 16th	■ Meeting with the Director of the Water Department at the municipality in order to ascertain the current status of department operations.
Thursday, June 17th	■ Continuation of the previous activity.
Friday, June 18th	■ Gathering of information on: Tariffs Supply of and demand for water Billing Schedule of users User statistics Amounts charged for connections and other services.
Saturday, June 19th	■ Integration of the information gathered; review, analysis and calculations for projections; and description of the methodology to be used for financial analysis of projects.

DATE**ACTIVITIES**Second WeekMonday, June 21 through Saturday, June 26

Monday, June 21st

- Meeting with the chief of the Sewerage Section to ascertain the current status of section operations, and meeting with the Mayor of Machala.

Tuesday, June 22nd

- Arrival of Elsa de Mena in Machala and meeting with the Director of the Financial Department of the municipality.

Wednesday, June 23rd

- Continuation of the previous activity in order to ascertain the current status of accounting and budget operations of the municipality and their corresponding procedures.

Thursday, June 24th

- Gathering of information on revenues and expenditures of the Water Department and Sewerage Section.

Friday, June 25th

- Visit to the offices of IEOS in Pasaje to determine the financial resources required to put the Regional Water Treatment Plant into operation.

Tariffs

Supply of and demand for water

Billing

Schedule of users

User statistics

Amounts charged for connections and other services

Saturday, June 26th

- Analysis of the information obtained and design of the cost recovery financial plan so that it could be explained to the Directors of the Water Department, the Department of Planning and Projects, and the Financial Department of the municipality. Analysis of the legal basis for the creation and operation of the Municipal Water and Sewerage Enterprise.

DATE**ACTIVITIES**Third WeekMonday, June 28 through Saturday, July 3

Monday, June 28th

- Return of Elsa de Mena to Quito. Identification and evaluation of the factors impacting on the operation, maintenance, construction and financing of facilities, and cost recovery.

Tuesday, June 29th

- Preparation of projections of population, demand, users, and the costs of operation, maintenance and debt service for financing the project, including the prefeasibility study.

Wednesday, June 30th

- Continuation of the previous activity.

Thursday, July 1st

- Cost recovery estimates in accordance with the financial plan designed for that purpose.

Friday, July 2nd

- Continuation of the previous activity and explanation of the cost recovery financial plan to the Directors of the Water Department, Financial Department and Department of Planning and Projects of the municipality.

Saturday, July 3rd

- Preparation of the institutional development program to support the creation of the Machala Municipal Water and Sewerage Enterprise.

DATE**ACTIVITIES**Fourth weekMonday, July 5 through Saturday, July 9

Monday, July 5th

- Continuation of the previous activity. Return of Elsa de Mena to Machala. Preparation of conclusions and recommendations

Tuesday, July 6th

- Review of the institutional development program and of the conclusions and recommendations. Preparation of the report on the consultancy.

Wednesday, July 7th

- Presentation of conclusions and recommendations and of the Institutional Development Plan to the Mayor of Machala and to the Directors of the Financial Department, Water Department and Planning and Projects Department.

Thursday, July 8th

- Return of Jorge Infante and Elsa de Mena to Quito and presentation of the conclusions and recommendations to the USAID/Ecuador group.

A N N E X N O . 2
CLIPPINGS FROM MUNICIPAL NEWSPAPERS

Afirma Director del IEOS, Francisco Vera Domínguez:

"Redes de agua son un cedazo"

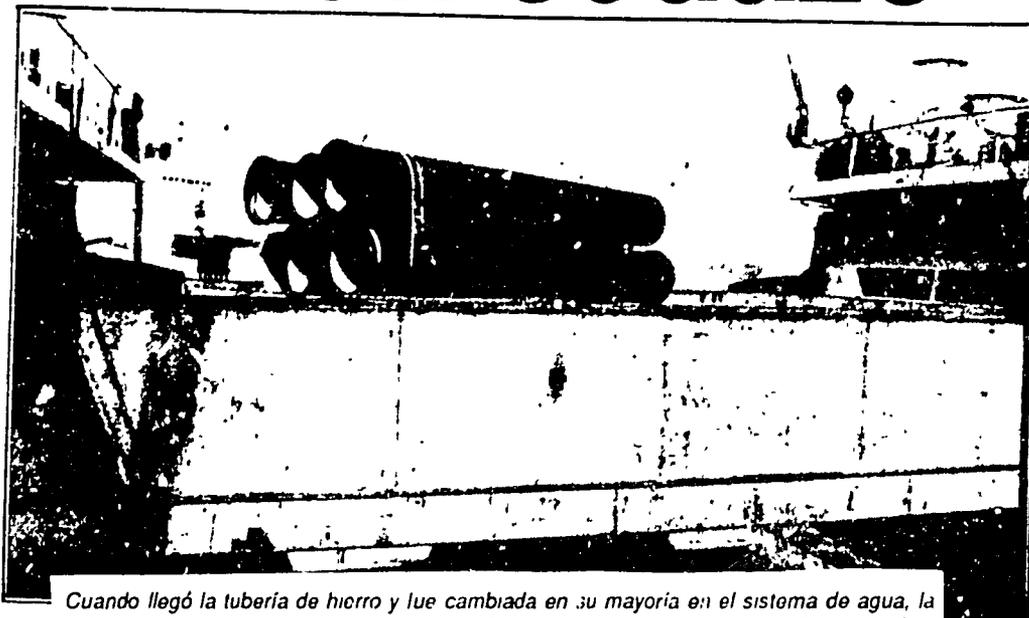
Página 4

Se requiera 20.000 millones de sucres para reparar las redes de agua potable de Machala, las mismas que en 90 por ciento están como cedazos. ¿De qué nos valdría tener en un futuro inmediato el agua de la Planta Regional cuando no valen las redes? es la interrogante de los machaqueños.



Francisco Vera Domínguez afirma:

"Redes de agua son un cedazo"



Cuando llegó la tubería de hierro y fue cambiada en su mayoría en el sistema de agua, la colectividad esperaba una pronta culminación de los trabajos, pero lamentablemente, han pasado los años y sólo los olrecimientos han quedado

Municipio es responsable

Las administraciones anteriores que se turnaron o pasaron por la Alcaldía de Machala son las culpables para que en la actualidad se encuentra en deplorables condiciones las redes de distribución de agua, puesto que por un lado permitieron un crecimiento sin control de la ciudad, propiciando invasiones y generando desorden de la ciudad sin estudios previos y sin contar con lo elemental antes de producir los asentamientos: olvidaron deliberadamente la ubicación de los conductos de agua potable y los sistemas de distribución tanto en canalización de aguas servidas

cuanto de agua potable. Precisamente porque la Municipalidad no ha logrado crear a través de ordenanzas y leyes locales impedir se cometan estos abusos, en los actuales momentos todos sufrimos estas irresponsables actitudes de pesimas autoridades que no fueron tales

20 mil millones cuestan redes

Haciendo un cálculo de lo que costaría la nueva construcción de las redes de distribución que requiere la ciudad de Machala se dice que estas tienen un precio total de unos 20 mil millones de

sure, cuyo plazo o tiempo de construcción no llevaría más allá de 8 meses, dijo el Jefe del IEOS de El Oro. Pero mientras se dejó pasar en forma irresponsable más el tiempo los costos seguirán subiendo y cada vez se hará imposible contar con un buen sistema de redes de distribución aún existiendo millones de metros cúbicos en tanques reservorios

Es decir que se hace urgente pensar en los estudios y recursos que puedan destinarse a esta construcción del sistema de redes que en la actualidad se encuentran totalmente destruidas, agregó Vera Domínguez.

El Director del Instituto Ecuatoriano de Obras Sanitarias IEOS de la provincia de El Oro, Ing Francisco Vera Domínguez, dijo a OPINION ayer que las redes y tubería de agua de Machala son parecidas a cedazos, si intentar graficar el deplorable estado en el que se encuentran las acometidas domiciliarias y conductos que en la actualidad intentan abastecer del líquido vital a las familias de esta capital orense.

El funcionario público indicó que de alguna manera es preciso decir la verdad con la finalidad que se conozca el real estado en que se encuentra la tubería ya casi en desuso enterrada en el subsuelo de la ciudad de Machala y que esta ya no sirve para nada, mientras que la ciudadanía se queja constantemente de la escasez marcada de agua en los domicilios. La Municipalidad de Machala se esfuerza en incrementar el caudal de agua para que los habitantes de la capital bananera del mundo obtengan el líquido vital, pero al parecer esa no es la única solución al problema, dijo Francisco Vera Domínguez, al tiempo que recordó que el 90% de la tubería se encuentra huequeada y esta se asemeja a un cedazo puesto que toda el agua que se quiera dejar circular por esta, no llegará a los lavamanos de los domicilios sino que se acumulará en el subsuelo conjuntamente con las agua servidas

**40 mil millones
planta regional**

De otro lado señaló el Director del IEOS que en los actuales momentos se han gastado en forma total unos 40 mil millones de sucres en el "bendito sistema" regional de agua potable que desde hace aproximadamente 14 años no entra a funcionar, mientras que la ciudadanía de los cantones de Pasaje, El Guabo y Machala "se mueren de sed"; esto no puede seguir así, manifestó el funcionario.

Terminaremos la obra

Pero terminaremos definitivamente la obra del Sistema Regional de Agua Potable, puesto que el mismo Presidente Sixto Durán Ballén se encuentra empeñado en que así suceda, señaló Francisco Vera Domínguez. Nosotros terminaremos a más tardar en Febrero del próximo año los trabajos con las pruebas respectivas; pero será de responsabilidad total de la Municipalidad si el agua no puede llegar a los domicilios de las familias de Machala, puesto que esa Institución es la responsable absoluta de este trabajo final. El IEOS y el Gobierno asesora y de alguna manera sugiere técnicamente lo que se debe realizar, pero el Municipio es el responsable de que la ciudadanía pueda beber agua y limpia, señaló.

Obras inútiles

Sin desmejorar las magníficas gestiones que puedan efectuar las autoridades Municipales y gubernamentales, se debe dar prioridad a los trabajos urgentes en lo relacionado a la nueva red de distribución de agua, caso contrario se invertirán recursos en forma inútil en obras por supuesto que requieren soluciones y no se solucionaría absolutamente el problema de la escasez de agua de Machala. El agua más se desperdicia que la que se utiliza, la tubería de las redes de distribución son un verdadero cedazo, finalizó señalando el director del IEOS Francisco Vera Domínguez

6. EL UNIVERSO
—domingo 4 de julio de 1993

Protestas en Machala por la falta de agua

MACHALA, (Rodrigo Pineda).— Se generalizó el clamor ciudadano por la aguda escasez de agua potable, principalmente en los cantones de Machala y El Guabo, y moradores de distintos sectores de esta capital provincial y de Puerto Bolívar realizaron marchas de protestas en un afán de llamar la atención del alcalde, Mario Minu-

che Murillo.

El presidente Sixto Durán-Ballén ofreció en una de sus últimas visitas a Machala, que hasta diciembre de este año la tan esperada Planta Regional de Agua Potable, que servirá a los cantones de Pasaje, El Guabo y Machala, entrará definitivamente en funcionamiento.

Se teme epidemia

El Oro sin infraestructura sanitaria

Por GABRIEL VITERI PORRAS

La escasez de agua potable y la falta de sistemas de alcantarillado, para la evacuación de aguas lluvias y servidas, son problemas que afectan a los diferentes cantones de la provincia de El Oro y que pueden causar graves epidemias con la consecuente disminución de las actividades productivas.

El estado sanitario de Machala, Puerto Bolívar y otras ciudades orenses es realmente calamitoso, donde enfermedades como el cólera, tifoidea y otras han llegado para quedarse, por lo que se requiere de manera urgente la terminación de la construcción de sistemas de agua potable, como el regional de Machala, y otros.

Así también, se necesita la ejecución y/o ampliación de redes de alcantarillado sanitario en los cantones y parroquias orenses que carecen o tienen deficiencia de esta clase de obras básicas.

De acuerdo con un informe elaborado por el ingeniero Francisco Vera Domínguez, director provincial del Instituto Ecuatoriano de Obras Sanitarias (IEOS) de El Oro, el problema de la falta de una infraestructura sanitaria básica afecta a todos los residentes de Machala y Puerto Bolívar.

Puntualiza en el documento que la producción actual de agua potable es de 425 litros por segundo, de los

cuales se pierden 255 litros por segundo y se entrega solamente 170 lts. x seg., que contra una demanda de 625 lts. x seg. se tiene una insuficiencia de 455 lts. x seg., con lo que se sirve apenas a un 27,2% de la población estimada en 180 mil habitantes para Machala y Puerto Bolívar. La provincia de El Oro tiene una superficie de 5.900 km², en la que residen alrededor de 415.000 habitantes.

También los camarones

La producción de camarones podría verse afectada debido a la contaminación con aguas servidas que son descargadas, sin ningún tratamiento, directamente a los esteros El Macho, en el norte, Huaylá y Nuevo Pilo, en el sur, que han contaminado las aguas que abastecen las piscinas camaroneeras, señaló el director del IEOS.

Un estudio realizado en 1986 por consultores contratados por el IEOS, para la construcción de un sistema de alcantarillado para Machala y Puerto Bolívar, ha sido cuestionado por cuanto se recogerían todas las aguas negras a través de cuatro grandes colectores que tienen cortes mayores a 5 metros de profundidad, que con los niveles freáticos (filtraciones de aguas) altos, que existen en el medio, complicarían la construcción.

Otro aspecto que dificultaría la ejecución del alcantarillado es la construcción de cuatro estaciones eleva-

doras que por sus requerimientos de energía, operación y mantenimiento se constituirían en un serio problema.

Se indica, también, en el reporte, que todo el tratamiento se lo haría en una extensión de 155 hectáreas ubicadas en el sector de La Primavera, donde se construirían las lagunas de oxidación. La adquisición de los terrenos es un problema por los elevados costos, ya que es una zona de producción bananera.

Para solucionar las dificultades enumeradas, el Director Provincial del IEOS, de El Oro, sugiere la contratación inmediata de un estudio para el alcantarillado integral que considere zonificaciones con tratamientos independientes y de tipo compacto en donde el área de utilización del suelo sea el mínimo.

Redes de agua potable

Indicó el director provincial del IEOS de El Oro, Francisco Vera Domínguez, que para mejorar el aprovisionamiento de agua potable para Machala y Puerto Bolívar es necesaria la urgente reparación de las redes de agua potable, cuyo costo sería de 20 mil millones de sucres aproximadamente, sin considerar la ampliación de nuevas tuberías para atender a los barrios suburbanos.

"En caso de que la Municipalidad no asuma con entereza este grave problema, se tiene proyecciones desas-

No se concretan planes de irrigación

MACHALA, (Rodrigo Pineda).— Varios sectores sociales y productivos de la provincia de El Oro criticaron la falta de concreción del Gobierno sobre la urgente necesidad de poner en marcha los proyectos Tahuín y Jubones, mientras miles de hectáreas de suelo agrícola están sufriendo la falta de agua con el peligro de que se pierdan cultivos de banano, cacao, café y otros productos de ciclo corto.

La presa Tahuín permanece abandonada porque no se financia la construcción del sistema de canales y otras obras complementarias que permitirán irrigar alrededor de 10 mil hectáreas de tierras productivas en el cordón fronterizo, no obstante que fue una promesa formal del ministro de Agricultura, Mariano González, durante una visita que efectuó hace varios meses.

La presa Tres Cerritos, que es la primera etapa del

Proyecto Jubones, prevista para regar 15 mil hectáreas de plantaciones agrícolas de la parte baja de El Oro, de las 50 mil que comprende el proyecto en su totalidad, tampoco se ha considerado por parte del Gobierno. La presa es importante por su doble función de irrigar y de controlar la creciente del río Jubones, cuyos desbordamientos en inviernos causan ingentes pérdidas a los agricultores de la zona.

En este aspecto, el anunciado dragado del río Jubones propuesto por una empresa holandesa a un costo de 50 millones de dólares, que serían canjeados por banano, tampoco tuvo hasta el momento una respuesta favorable por parte del Gobierno, a pesar de que esta aspiración la plantearon los bananeros oreños y las principales autoridades de la provincia en una sesión de trabajo al presidente Sixto Durán-Ballén, según se quejaron representantes del sector agrícola.

trosas, según se observa en un cuadro de 'No acción' preparado por el consultor de WASH, (Agua y Saneamiento para la Salud), ingeniero Elio Arniella, en mayo de 1993".

Resaltó el Director Provincial del IEOS que al succionar los moradores el agua de las tuberías, que tienen muchas roturas, succionan también aguas servidas infiltradas de las canalizaciones, con lo que contaminan el agua potable con bacterias que pueden causar varias enfermedades como có-

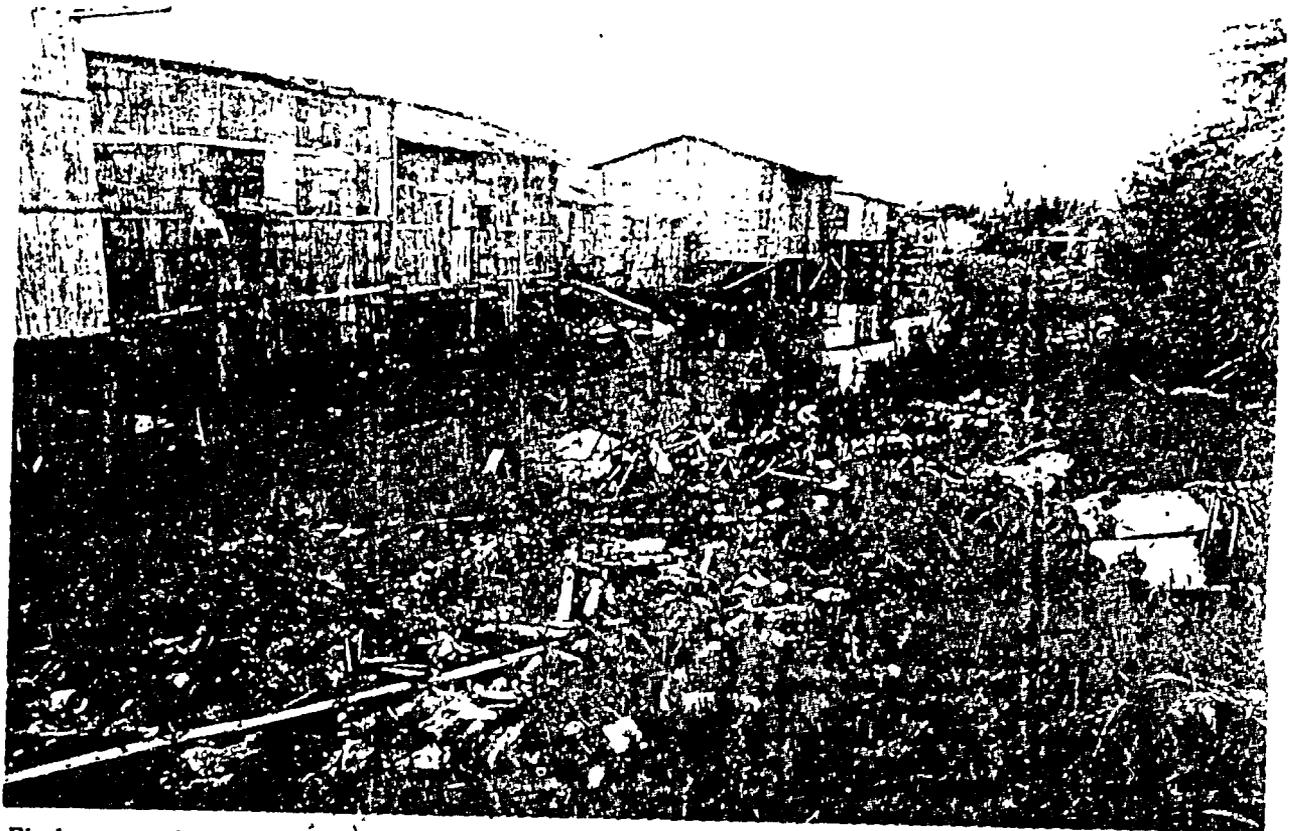
lera, tifoidea, hepatitis, hongos de la piel, etc.

La planta de tratamiento de La Lucha se abastece de agua a través de un canal de 40 km de longitud, que toma el líquido del río Jubones. En este lugar se produce 105 lts. x seg. de agua potable.

Adicionalmente se capta agua del río Casacay que entrega a través de la Planta Regional de Tratamiento de agua potable para El Oro un volumen de 40 lts. x seg., que estaría terminada en pocos meses, anotó.

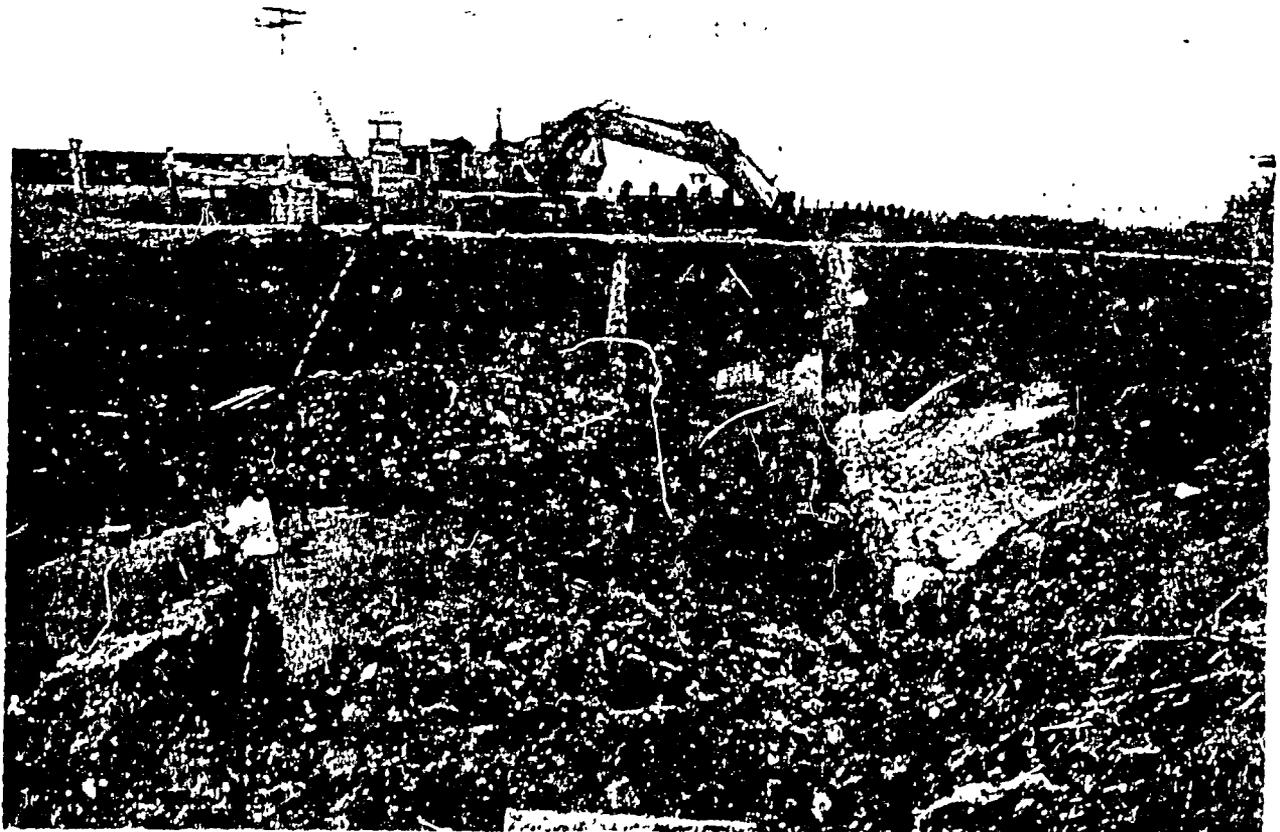
Según Francisco Vera Domínguez la falta de agua potable se puede solucionar de manera fácil si se incorporan pozos profundos a la producción de agua potable.

Sin embargo, la conclusión de los trabajos de construcción de la planta de agua potable han sido cuestionados por cuanto la obra está desfinanciada y el diseño no responde a las necesidades actuales de la población oreña, por lo que es necesaria la terminación urgente de la obra y su ampliación inmediata.



El desmesurado e incontrolado crecimiento de los diversos barrios marginales, tanto de Machala como de Puerto Bolívar, han vuelto crítico el aprovisio-

namiento de agua potable, por lo que se requiere la terminación y ampliación de la Planta Regional de Agua Potable.



La falta de alcantarillado y las descargas de aguas negras, sin ningún tratamiento, a los esteros El

Macho, Huaylá y otros ponen en riesgo la salud de la población y la producción camaronera de El Oro.

Fotos Andrés Rendón / EL UNIVERSO

EDITORIAL

Agua potable: problema sin solución

Como en sus peores momentos del pasado cercano, la ciudad y sus múltiples barrios adolecen de la acentuada falta de agua potable, producto de la conjugación de una serie de factores que se han ido desatendiendo, sin que sea posible la solución inmediata y definitiva.

El clamor es generalizado, pues en cualquier parte de la ciudad, es lugar común el observar a gente esperando inútilmente que de las tuberías salga aunque sea en gotas el líquido elemento, y a pesar de que las bombas eléctricas para succionar fueron en su momento la aparente solución, el hecho es que simplemente no hay agua. Las razones, entran al campo de los secretos más celosamente guardados en esta administración municipal, pues a pesar de los esfuerzos del Alcalde, tal parece que los mandos medios entorpecen de propósito sus deseos de que la ciudad pueda contar con un caudal que abastezca las necesidades incrementadas de una población sedienta.

Contribuye a aumentar la insatisfacción popular, el hecho de que no hay una explicación medianamente creíble, por parte de los técnicos a cargo del suministro del líquido, y mientras que en los barrios se sufre por la carestía, al parecer los pozos donde se proveen los negociantes de los tanqueros, no se agotan jamás, nunca se dañan sus bombas y el aprovisionamiento es permanente, día y noche, como parte del lucrativo negocio que representa el pagar irrisorias cantidades por el derecho a llenar un tanquero, y luego comercializarlo al precio que les dá su voluntad y las posibilidades del cliente.

Pasan los días y meses, y hasta ahora se ha dado siquiera un paso en la integración del organismo que por ley tiene que entrar a administrar la Planta Regional de Agua Potable, cuando se la termine, una especie de utopía o sueño que se mantiene gracias a las repetidas mentiras oficiales y su permanente queja de la falta de dinero.

Volvemos a insistir para que se agoten todas las gestiones tendientes a lograr que el Gobierno autorice, con la misma buena voluntad y presteza que lo hizo para situar dineros para los estadios de fútbol, la inversión y obtención de intereses sobre los depósitos inactivos que mantiene la Autoridad Portuaria de Puerto Bolívar en el Banco Central de Machala, que perfectamente y sin afectar el patrimonio destinado para cancelar la deuda extranjera, podrían servir para de una sola vez, concluir los dilatados trabajos.

Mientras ello no ocurra, seguiremos sufriendo y muriendo de sed junto a la fuente, pues el agua de los ríos orenses se desperdicia en el mar, sin aprovecharse en beneficio de la comunidad machaleña.



ACUPUNTURAS

POR CHARLIE CHANG

"Señor, tengo sed!", fue la frase pronunciada por Chucho el Nazareno, según la bíblica versión de lo ocurrido en el calvario, cuando estaba en agonía esperando la muerte. Con una esponja embebida en vinagre, un infeliz legionario aumentó las penalidades del crucificado. Haciendo una homologación a tiempos modernos, nuestro Juan Pueblo Nazareno, igualmente colgado y crucificado, le dice a Chucho el Alcalde. "Señor, tengo sed!", y quienes rodean al funcionario en calidad de "asesores" o llamados mejormente "guachimanes" por el pueblo, se encargan de sopetearle en la cara y meterle en la boca al pobre Juancho, más vinagre, para que siga sufriendo por la falta de agua.....! es un coro que lo repiten en alta voz por todas partes en la ciudad. "¡TENEMOS SED, SEÑOR ALCALDE!" y que amenaza ser la "cantata" de moda, a punto de convertimos los machaleños y asentados en legítimos "camellos", por aquello de no más tomar agua cada 30 días y de allí, a aguantar!....

"No hay sulfato", dizque es la respuesta, y surge enseguidita la pregunta preguntona. ¿Es que acaso el oficial proveedor del municipio se quedó sin reservas?... Caray, no deberían dejarse caer en estas simplezas, y hacer como dice la canción, que "si se les apaga una vela, otra se vuelve a emprender", y los volúmenes de consumo deberían llevar a la Municipalidad a pensar en una masiva importación de los productos que utilizan para medio potabilizar el agua y quitarle las inmundicias que trae, "sólo que" esito equivaldría a quitar de las manos de alguien, un redondo negocio que es el suplir químicos. ¡no se me vayan a poner trompudos, que es una verdad más grande que la carestía de líquido en las tuberías. Un ocurrido amigo estaba pensando poner como negocio para salir de la terrible pda, el vender globitos inflados, con el puritito aire que sale de las cañerías, para las fiestas de la ciudad. A lo mejor es tan salado que justo en ese rato le sale agua, y carnaval está lejos, como para guardarlas, cierto?

Acho, ya los veo, revoloteando alrededor del Alcalde Mario y con el chisme en la punta de la lengua "Mario, ¿viste como te hace pedazos el Charlie Chang?", que es la cantilena de costumbre, cuando se publica algo que no suena a elogio ni huele a quemada de incienso. ¡han de seguir metiendo carbón, como que el Alcalde fuera fogón, con el cuento de "Mira, ni porque es tu cuñado te respeta, venir a achacarte en vez de callarse, ¿no le vas a cobrar los impuestos que está debiendo? Hay que cargársele, para que no te frague más!". Como dice la salsera canción, "Yo conozco bacalao, aunque venga disírazo". El Dr. Chucho sabe que nosotros no comamos de ninguna pata y que los chimentos de los "guachimanes" me tienen sin cuidado, continas que cuando el Teclador señala algo, es porque es la verdad verdadera. Que a ellos se les erize el lomo y se pongan bravos, su problema, pero deberían mejor, dirigir sus untuosos afanes, a ayudarle a solucionar el problema del agua, que parece ser "valetudinano".

Agua, clamor general



Ciudadanos de toda condición social, en pleno centro de Machala, hacen largas filas para abastecerse de agua. Una abrupta suspensión originó serios problemas a la comunidad que reclama con razón que se entregue un servicio por el que pagan religiosamente. Al respecto, oficialmente se anunció que nuevamente se reinició el bombeo de 400 litros por segundo lo que en unas doce horas más permitirá superar el problema. Es de esperar que eso se cumpla ya que una nueva situación como la que se está viviendo bien podría generar hechos de impredecibles consecuencias

A N N E X N O . 3
I. MUNICIPALITY OF MACHALA
STRUCTURAL ORGANIZATION CHART

I. MUNICIPALITY OF MACHALA
STRUCTURAL ORGANIZATION CHART

- | | |
|------------------------------------|---|
| 1. Special Commissions | 26. Department of Justice, Police and Vigilance |
| 2. Municipal Council | 27. Commissary |
| 3. Permanent Commissions | 28. Police Force |
| 4. Office of the Mayor | 29. Department of Urban Planning |
| 5. Office of the Secretary | 30. Planning |
| 6. Office of the Síndico | 31. Soil Use, Buildings and Projects |
| 7. Internal Auditing | 32. Soil Management |
| 8. Public Relations | 33. Public Services Department |
| 9. Administrative Department | 34. Slaughterhouse |
| 10. File Section | 35. Markets |
| 11. Library Section | 36. Cemetery |
| 12. Medical Services Section | 37. Street Cleaning |
| 13. Commissary Section | 38. Water Department |
| 14. Miscellaneous Services Section | 39. Treatment |
| 15. Social and Cultural Promotion | 40. Distribution Network |
| 16. Planning and Projects | 41. Service Inspection |
| 17. Financial Department | 42. Department of Public Works |
| 18. Appraisals and Cadaster | 43. Supervision and Fiscal Affairs |
| 19. Revenues | 44. Roads and Paving |
| 20. Accounting | 45. Sewerage |
| 21. Treasury | 46. Tree Planting |
| 22. Procurement | 47. Machine Shops |
| 23. Computer Operation | 48. Human Resources |
| 24. Warehouse | |
| 25. Real Property | |

A N N E X N O . 4
IMPROVEMENT OF THE WATER DISTRIBUTION SYSTEM FOR
MACHALA - PUERTO BOLIVAR

COST SUMMARY TABLE

IMPROVEMENT OF THE WATER DISTRIBUTION SYSTEM FOR MACHALA - PUERTO BOLIVAR

Cost Summary Table (in sucres)

DESCRIPTION	TOTAL CONSTRUCTION COST	ANNUAL OPERATING AND MAINTENANCE COST	ANNUALIZED CAPITAL COSTS	TOTAL ANNUAL COSTS
Distribution System	223,158,712,500	476,610,750	2,019,074,750	2,495,685,500
Storage Tanks	3,465,000,000	38,500,000	302,090,250	340,590,250
New Wells and Network	(2)	945,733,250	(2)	945,733,250
Pressure Filter Plant	5,614,724,500	1,073,168,250	489,527,500	1,562,695,750
T O T A L	32,238,437,000	2,534,012,250	2,810,692,500	5,344,704,750

- (1) The US dollar costs of the prefeasibility study were converted to sucres at a rate of exchange of US\$1 = S/.1,92¢, the official selling price, and not the free exchange rate used by banks and money exchange operations, which is lower.
- (2) Funds to cover the investment cost for the construction and outfitting of the wells will be provided by FONDORO (55%) and the municipal budget (45%). This investment is scheduled to take place during the second half of 1993, as a result of which it has been excluded from the table of investments, with only operating and maintenance costs being taking into consideration.

ANNEX NO. 5
NORMS, CONTRACTS AND AGREEMENTS RELATING
TO THE MUNICIPAL DEVELOPMENT
AND URBAN INFRASTRUCTURE PROGRAM (PDM)

NORMS, CONTRACTS AND AGREEMENTS RELATING TO THE MUNICIPAL DEVELOPMENT AND URBAN INFRASTRUCTURE PROGRAM (PDM)

The program is financed with external credit funds provided by two loans for US\$104 million each provided by the IDB and the World Bank to the Government of Ecuador, and with support provided by the Technical Assistance Office of the Government of Germany (GTZ) and local counterpart funds totalling US\$88 million provided by the Municipal Investment Fund. Internal financing was created through the issuance of the Sectional Development Law, which is Law No. 72 issued on May 21, 1990, the same law that institutionalizes the PDM and creates the Sectional Development Fund (FODESEC). This law allocates to the PDM permanent autonomous resources from FODESEC, with a 2% participation in the net resources of the central government budget and with three participations as provided for in that same law.

The PDM was created to be a streamlined and efficient mechanism to provide for the financing of basic infrastructure and services and ensure the self-governing capability of the municipalities and their municipal enterprises by means of alternative training and technical assistance programs, the objective of which is institutional strengthening and the provision of services to their communities.

This is the same law that stipulates that the Provincial Water Enterprise of Guayas and other enterprises of the same type as may be created in the future (such as in the case of the Machala enterprise) may be credit subjects. The enterprises, on the basis of a resolution issued by their Board of Directors, may set rates and special improvement assessments, as provided for in the Law of Municipal Administration.

The same law creates the Municipal Investment Fund (FIM), whose resources are to be provided by FODESEC and earmarked for providing national counterpart funds for external credits co-financed by the PDM, as follows: surplus resources forming a part of the Banco del Estado-administered Municipal Development Budget, the amount of which is to be determined at the end of each fiscal year and distributed to the municipalities as complementary, nonreimbursable financing for their investments.

FIM resources will be used primarily to complement the payment capability of beneficiaries in the basic sanitation sector.

The PDM can finance urban sanitation projects, including water distribution, and the Banco del Estado will transfer resources from the PDM to the municipalities and municipal enterprises by means of loans, savings incentives, or a combination of loans, savings incentives and transfers, depending on the payment capacity of the beneficiary population and the sectors being financed, i.e., as a rule subsidies (transfers) and savings incentives are not reimbursable.

Once the PDM Project Committee approves a project profile, i.e., at the prefeasibility level, it proceeds to authorize financing for the preparation of the project, the cost of which is included in the total cost of the project to be financed. To this end, the Banco del Estado and the requesting entity sign a letter of commitment in which the obligation is set forth.

Subsidies among other sectors may be received by the water and sewerage sector, providing that it is shown that the rates, taxes and assessments to be applied cover administrative, operating and maintenance costs. The subsidy, which would be nonreimbursable, would be granted to cover that part of the investment cost not covered by such rates, tariffs, taxes or assessments.

The maximum amortization period for water distribution projects is 20 years, which includes a grace period equal to the duration of the construction period.

The rate of interest will be the free rate for contracting, which is currently on the order of 36%.

A N N E X N O . 6
N E W M I N I M U M W A G E

Compensación se incrementa en 12 mil

Alza de 6 mil sucres en el salario mínimo

QUITO.- El Gobierno Nacional incrementó en 6.000 sucres el Salario Mínimo Vital General y en 12.000 sucres la compensación por alto costo de la vida a los trabajadores de los sectores público y privado.

El anuncio lo hizo el Ministro de Trabajo, Alfredo Corral, quien indicó que el Salario Mínimo Vital será de 66 mil sucres mensuales.

Para los trabajadores del servicio doméstico el salario mínimo se incrementó de 30 mil a 33 mil sucres mensuales y la compensación por alto costo de la vida de 36 mil a 44 mil sucres mensuales.

Aseguró que este aumento será cubierto con reajustes que se harán al Presupuesto General del Estado y con los ingresos adicionales que se obtendrán por la exportación petrolera. Descartó la posibilidad de nuevos impuestos o incremento del precio de los combustibles para cubrir esta alza salarial.

El nuevo monto significa para el Estado, un egreso de alrededor de 70 mil millones de sucres para el ejercicio económico del último semestre de este año.

Explicó que el nuevo salario mínimo se efectuó sobre la base de los índices de inflación actuales, pues de acuerdo con el salario mínimo anterior de 60 mil sucres, los 18 mil de incremento total, significan el 30%.

Recordó que este incremento es el cuarto que se registra en el presente Gobierno, con lo cual el ingreso mínimo de un trabajador ecuatoriano llega a 173.667 sucres mensuales.

El incremento a la compensación por alto costo de la vida no será deducible de los aportes al IESS, mientras que los seis mil sucres de incremento al salario, sí.

Con los incrementos, el Salario Mínimo Vital real de un trabajador, se compone de: Salario Mínimo, 66.000; compensación por alto costo, 67.000; bonificación complementaria, 1.000; decimotercer sueldo, 5.500; decimocuarto sueldo, 11.000; decimoquinto sueldo, 4.167; decimosexto sueldo, 11.000; compensación por transporte, 3.000; total 173.667 sucres.

EL UNIVERSO
JULIO 1º DE 1993

A N N E X N O . 7
F I N A N C I A L P R O J E C T I O N S

MUNICIPALITY OF MACHALA FINANCIAL PROJECTIONS

ANNEX 7.1

Page 1 of 4

CONCEPTS	1993	1994	1995	1996	1997
BASIC INFORMATION					
Total Population	176,265	182,964	189,916	197,133	204,624
Population Served	75,794	91,482	104,453	128,136	153,468
% Population with Water Service	43 %	50 %	55 %	65 %	75 %
Water Connections	18,046	21,781	24,870	30,508	36,540
Estimated Annual Consumption (m ³) ⁽¹⁾	6,181,056	8,363,904	9,550,080	11,715,072	14,031,360
Estimated Consumption/Connection/Month (M ³)	28.5	32.0	32.0	32.0	32.0
% Water Not Accounted For (Losses)	60 %	60 %	50 %	40 %	30 %
Production in Liters per Second	491	1,204	1,075	1,066	1,057
Losses in Liters per Second	295	722	538	426	317
Average Monthly Cost per User (in sucres) ⁽²⁾	5,433	8,945	7,144	6,716	6,445
Average Monthly Revenue per User (in sucres)	685	6,500	7,500	8,300	9,100
OPERATING STATEMENTS (in thousands of sucres) ⁽²⁾					
OPERATING REVENUES					
Revenues from the Sale of Water	148,345	1,698,918	2,238,300	3,038,597	3,990,168
Connections and Repairs	2,227	61,627	50,968	93,027	99,528
TOTAL REVENUES	150,572	1,760,545	2,289,268	3,131,624	4,089,696
OPERATING, MAINTENANCE AND ADMINISTRATIVE COSTS					
Salaries, Wages and Employee Benefits	467,208	490,568	515,096	566,606	623,267
Water Treatment Materials	182,050	182,050	- 0 -	- 0 -	- 0 -
Electricity	80,992	80,992	60,745	60,745	60,745
Materials and Tools	21,200	21,836	22,491	23,166	23,861
Equipment and Construction Project Maintenance	28,160	29,005	29,875	30,771	31,695
Fuel and Lubricants	36,339	36,339	- 0 -	- 0 -	- 0 -
General Expenditures	7,890	8,285	8,700	9,134	9,591
Block Water Supply (Regional Plant)	- 0 -	289,907	285,587	281,267	276,947
Project Operating, Maintenance and Administrative Costs	- 0 -	945,733	945,733	945,733	945,733
TOTAL OPERATING, MAINTENANCE AND ADMINISTRATIVE COST	823,839	2,084,715	1,868,227	1,917,422	1,971,839
NET OPERATING REVENUES	(673,267)	(324,170)	421,041	1,214,202	2,117,857
Depreciation	354,857	314,857	314,857	634,342	953,826
OPERATING SURPLUS (DEFICIT)	(1,028,124)	(639,027)	106,184	579,860	1,164,031

(1) Based on an estimated consumption of 250 LHD and 4.2 persons/connection

(2) At constant 1993 prices

(3) Includes depreciation of reappraised fixed assets.

MUNICIPALITY OF MACHALA FINANCIAL PROJECTIONS

ANNEX 7.1

Page 2 of 4

CONCEPTS	1998	1999	2000	2001	2002
BASIC INFORMATION					
Total Population	212,400	220,471	228,849	235,545	246,572
Population Served	169,920	187,400	205,964	214,346	226,846
% Population with Water Service	80 %	85 %	90 %	91 %	92 %
Water Connections	40,456	44,619	49,039	51,034	54,011
Estimated Annual Consumption (M ³) ⁽¹⁾	15,535,104	17,133,696	18,830,976	19,597,056	20,740,224
Estimated Consumption/Connection/Month(M ³)	32.0	32.0	32.0	32.0	32.0
% Water Not Accounted For (Losses)	25 %	20 %	20 %	20 %	20 %
Production in Liters per Second	1,047	1,037	1,027	1,017	1,006
Losses in Liters per Second	262	207	205	203	201
Average Monthly Cost per User (in sucres) ⁽¹⁾	9,989	9,081	8,285	8,055	7,614
Average Monthly Revenue per User (in sucres)	10,000	10,000	10,000	10,000	10,000
OPERATING STATEMENTS (in thousands of sucres) ⁽²⁾					
OPERATING REVENUES					
Revenue from the Sale of Water	4,854,720	5,354,280	5,884,680	6,124,080	6,481,320
Connections and Repairs	64,614	68,689	72,930	32,917	49,120
TOTAL REVENUES	4,919,334	5,422,969	5,957,610	6,156,997	6,530,440
OPERATING, MAINTENANCE AND ADMINISTRATIVE COSTS					
Salaries, Wages and Employee Benefits	641,965	661,224	681,060	701,492	722,537
Water Treatment Materials	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Electricity	60,745	60,745	60,745	60,745	60,745
Materials and Tools	24,577	25,314	26,074	26,856	27,662
Equipment and Construction Project Maintenance	32,645	33,625	34,634	35,673	36,743
Fuel and Lubricants	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
General Expenditures	10,071	10,575	11,103	11,658	12,241
Block Water Supply (Regional Plant)	272,147	267,348	262,548	257,748	252,468
Project Operating, Maintenance and Administrative Costs	2,534,012	2,534,012	2,534,012	2,534,012	2,534,012
TOTAL OPERATING, MAINTENANCE AND ADMINISTRATIVE COST	3,576,162	3,592,843	3,610,176	3,628,184	3,646,408
NET OPERATING REVENUES	1,343,172	1,830,126	2,347,434	2,528,813	2,884,032
Depreciation	1,338,157	1,338,157	1,338,157	1,338,157	1,338,157
OPERATING SURPLUS (DEFICIT)	5,015	491,969	1,009,277	1,190,656	1,545,875

(1) Based on an estimated consumption of 250 LHD and 4.2 persons/connection.

(2) At constant 1993 prices.

(3) Includes depreciation of reappraised fixed assets.

FUNDS FLOW (in thousand of sucres) ⁽¹⁾

ANNEX 7.1

Page 3 of 4

C O N C E P T S	1993	1994	1995	1996	1997
ORIGIN OF FUNDS					
Operating Surplus (Deficit)	(1,028,124)	(639,027)	106,184	579,860	1,164,031
Depreciation	354,857	314,857	314,857	634,342	953,826
TOTAL INTERNAL FUNDS	(673,267)	(324,170)	421,041	1,214,202	2,117,857
Subsidies to Cover Operating and Maintenance Costs	673,267	324,170	- 0 -	- 0 -	- 0 -
Recovery of the Cost of Water Meters	- 0 -	- 0 -	- 0 -	716,400	2,149,200
Special Improvement Assessments ⁽²⁾	- 0 -	- 0 -	- 0 -	- 0 -	5,378,400
Loan from Banco del Estado ⁽³⁾	- 0 -	- 0 -	- 0 -	16,253,850	8,618,213
FIM Subsidy for the Project	- 0 -	- 0 -	- 0 -	⁽⁶⁾ 3,868,612	⁽⁶⁾ 2,579,075
TOTAL EXTERNAL FUNDS	673,267	324,170	- 0 -	20,838,862	18,724,888
TOTAL ORIGIN	- 0 -	- 0 -	421,041	22,053,064	20,842,745
APPLICATION OF FUNDS					
Project Investments	- 0 -	- 0 -	- 0 -	19,343,062	12,895,375
Capitalized Interest	- 0 -	- 0 -	- 0 -	2,479,400	6,273,445
Goods, Furniture and Other Investments ⁽⁴⁾	- 0 -	50,000	50,000	50,000	20,000
TOTAL INVESTMENTS	- 0 -	50,000	50,000	21,872,462	19,188,820
Debt Service on Loan ⁽⁵⁾	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Fluctuations in Working Capital	- 0 -	151,429	60,865	162,680	193,129
TOTAL APPLICATION	- 0 -	201,429	110,865	22,035,142	19,381,949
ANNUAL SURPLUS (DEFICIT)	- 0 -	(201,429)	310,176	17,922	1,460,796
ACCUMULATED SURPLUS (DEFICIT)	- 0 -	(201,429)	108,747	126,669	1,587,465

(1) At constant 1993 prices.

(2) The assessment will begin to be applied beginning in 1997, once the works have been put into operation.

(3) Includes interest, which may be capitalized, during construction, at 36 percent annual rate.

(4) Investments in facilities and equipment for the new enterprise have been included for 1994-95 and 1996.

(5) Payments begin six months following the final disbursement.

(6) 20 percent of the amount of the investment.

FUNDS FLOW (in thousand of sucres) ⁽¹⁾

ANNEX 7.1

Page 4 of 4

C O N C E P T S	1998	1999	2000	2001	2002
ORIGIN OF FUNDS					
Operating Surplus (Deficit)	5,015	491,969	1,009,277	1,190,656	1,545,875
Depreciation	1,338,157	1,338,157	1,338,157	1,338,157	1,338,157
TOTAL INTERNAL FUNDS	1,343,172	1,830,126	2,347,434	2,528,813	2,884,032
Subsidies to Cover Operating and Maintenance Costs	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Recovery of the Cost of Water Meters	2,149,200	716,400	- 0 -	- 0 -	- 0 -
Special Improvement Assessment ⁽²⁾	8,067,600	9,113,400	4,581,600	2,465,100	1,917,300
Loan from Banco del Estado ⁽³⁾	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
FIM Subsidy for the Project	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
TOTAL EXTERNAL FUNDS	10,216,800	9,829,800	4,581,600	2,465,100	1,917,300
TOTAL ORIGIN	11,559,972	11,659,926	6,929,034	4,993,913	4,801,332
APPLICATION OF FUNDS					
Project Investments	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Capitalized Interest	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Goods, Furniture and Other Investments ⁽⁴⁾	20,000	20,000	20,000	20,000	20,000
TOTAL INVESTMENTS	20,000	20,000	20,000	20,000	20,000
Debt Service on Loan ⁽⁵⁾	4,716,725	9,433,450	9,433,450	9,433,450	9,433,450
Fluctuations in Working Capital	(79,851)	101,286	107,463	49,275	72,931
TOTAL APPLICATION	4,656,874	9,554,736	9,560,913	9,502,725	9,526,381
ANNUAL SURPLUS (DEFICIT)	6,903,098	2,105,190	(2,631,879)	(4,508,812)	(4,725,049)
ACCUMULATED SURPLUS (DEFICIT)	8,490,563	10,595,753	7,963,874	3,455,062	(1,269,987)
TRANSFER TO COVER FUNDS DEFICIT	- 0 -	- 0 -	- 0 -	- 0 -	1,269,987

(1) At constant 1993 prices.

(2) The assessment will begin to be applied beginning in 1997, once the works have been put into operation.

(3) Includes interest, which may be capitalized, during construction, at 36 percent annual rate.

(4) Investments in facilities and equipment for the new enterprise have been included for 1994-95 and 1996.

(5) Payments begin six months following the final disbursement. Machala would pay only the amount of the loan, not including capitalized interest beginning in the year 2002.

WATER DEPARTMENT

Operating, Maintenance and Administrative Expenses as of December 1992 and December 1991

ANNEX 7.2

Page 1 of 2

		FUNCTION III - COMMUNITY SERVICES Program No. 3 — Water Supply	DEC / 92	DEC / 91	
2 - 330 - 100		GROUP I - SALARY EXPENSE	353,665,019	248,358,804	
110		Basic: Salaries and Wages	236,580,401	172,995,651	
120		Temporary: Paid Leave	65,542	- 0 -	
130		Additional: Benefits, Salaries and Bonuses	94,277,159	69,526,653	
140		Compensatory: Representation and Complementary	22,241,667	4,604,500	
150		Special: Occasional Services and Wages	500,250	1,232,000	
2 - 330 - 200		GROUP II - SERVICES	67,584,572	86,832,959	
210		Fielding and Mobilization of Staff: Per Diems	2,279,988	1,332,037	
*	220	Basic Services: Electricity	57,852,645	73,035,512	
240		Transportation and Storage: Fares and Freight	342,400	68,000	
250		Communication and Advertising: Mail and Printing	1,514,541	1,340,600	
270		Maintenance and Repair: Furniture, Equipment and Machinery	4,095,500	11,007,900	
290		Miscellaneous: Cleaning Expense	1,499,498	48,910	
2 - 330 - 300		GROUP III - MATERIALS AND SUPPLIES	168,930,656	165,396,409	
310		Office and Teaching: Office Supplies	500,894	99,995	
320		Clothing and Protective Garments: Suits	5,831,436	- 0 -	
370		Other: Cleaning Supplies and Nonspecified	1,115,728	516,360	
380		Other Materials	161,482,598	164,780,054	
	381	Fuel and Lubricants	25,956,608	5,671,954	
	*	382	Water Treatment Materials	110,036,590	153,110,100
		382.1	Water Treatment Materials (FONDORO)	20,000,000	- 0 -
		389	Nonspecified	5,489,400	5,998,000
2 - 330 - 400		GROUP IV - CHATTEL ASSETS	5,370,450	1,942,264	
420		Equipment for General Use: Office Equipment	- 0 -	25,000	
450		Basic Machinery: Purchase of Pumping Equipment	2,000,000	- 0 -	
460		Tools and Parts: Tools and Parts	3,370,450	1,917,264	

* The increased amount reflected for electricity and water treatment materials in 1991 does not represent consumption but rather payment of previously existing accounts payable.

WATER DEPARTMENT

Operating, Maintenance and Administrative Expenses as of December 1992 and December 1991

ANNEX 7 2

Page 2 of 2

		FUNCTION III - COMMUNITY SERVICES Program No. 3 — Water Supply	DEC / 92	DEC / 91
2 - 330 - 600		GROUP VI - CONSTRUCTION PROJECTS AND OTHER INVESTMENTS	17,566,846	69,271,880
670		Hydraulic Construction Projects:	4,860,446	69,271,880
	673	Expansion of Primary Networks to Outlying Neighborhoods	- 0 -	69,271,880
	679	Maintenance of Hydraulic Works	4,860,446	- 0 -
690		Maintenance of Works:	12,706,400	- 0 -
	691	Building Maintenance and Repair	706,500	- 0 -
	696	Facilities Maintenance	11,999,900	- 0 -
2 - 330 - 800		GROUP VIII - TRANSFERS	35,673,868	26,392,284
820		Social Security Contributions	27,666,951	20,003,559
	821	Employer Contributions	27,666,951	20,003,559
	822	Reserve Fund	- 0 -	- 0 -
870		Individual Subsidies: Subsidies	8,006,917	6,388,725
		GRAND TOTAL	648,791,411	598,194,600

WATER DEPARTMENT OF THE MUNICIPALITY OF MACHALA
ESTIMATES OF THE VALUE OF FIXED ASSETS IN OPERATION
(in sucres expressed at December 1992 levels)

D) MAIN, PRIMARY AND SECONDARY NETWORKS

ANNEX 7.3

Page 1 of 2

MATERIAL	DIAMETER (m)	LENGTH (meters)	PRICE OF PIPING (linear meter)	VALUE OF INSTALLATION INDIRECT EXPENSES PROFITS AND TAXES (linear meters)	VALUE PER LINEAR METER	TOTAL VALUE
MAIN NETWORK						
A.C.	600	1,380	S/. 359,566	S/. 175,920	S/ 535,486	S/ 738,970,680
PRIMARY NETWORK						
H.F.	450	650	450,000	214,807	664,807	432,124,550
A.C.	400	1,125	171,683	92,271	263,954	296,948,250
A.C.	350	5,650	143,148	79,286	222,434	1,256,752,100
A.C.	250	670	56,435	31,960	88,395	59,224,650
A.C.	200	6,850	35,600	23,001	58,601	401,416,850
P.V.C	200	3,750	35,000	22,743	57,743	216,536,250
A.C.	150	4,800	33,291	21,723	55,014	264,067,200
H.F.	150	1,450	150,000	74,338	224,338	325,290,100
TOTAL PRIMARY NETWORK		24,945				S/. 3,252,359,950
SECONDARY NETWORK						
A.C.	100	22,030	11,034	11,723	22,757	501,336,710
P.V.C.	100	2,595	11,670	11,997	23,667	61,415,865
P.V.C.	75	750	7,500	10,203	17,703	13,277,250
A.C.	50	2,400	7,728	10,301	18,029	43,269,600
P.V.C	50	450	2,670	8,127	10,797	4,858,650
P.L.	50	20,000	4,600	8,956	13,556	271,120,000
P.L.	25	12,000	1,400	7,580	8,980	107,760,000
TOTAL SECONDARY NETWORK		60,225				S/. 1,003,038,075
TOTAL NETWORKS		86,550				S/. 4,994,368,705

II) WELLS

ANNEX 7.3

Page 2 of 2

WELL	ELECTRIC INSTALLATION AND TRANSFORMER	PUMPS AND VALVES	WELL AND WELLHOUSE	TOTAL VALUE
LA UNION	S/. 41,787,575	S/. 51,500,000	S/. 122,000,000	S/. 215,287,575
PUBENZA	60,796,704	51,500,000	122,000,000	234,296,704
CORRALITOS	38,489,329	39,500,000	122,000,000	199,989,329
10 DE AGOSTO	25,700,000	39,500,000	122,000,000	187,200,000
TOTAL WELLS				S/. 836,773,608

III) VALVES

THE ESTIMATED VALUE OF THE VALVES IS:	S/. 66,000,000
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IV) LA LUCHA PLANT

THE TOTAL ESTIMATED VALUE OF LA LUCHA PLANT IS:	S/. 1,200,000,000
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ESTIMATED GRAND TOTAL OF ASSETS IN OPERATION:	S/. 7,097,142,313
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BASES FOR THE CALCULATION OF FINANCIAL PROJECTIONS

ANNEX 7.4

1) Total Population

The population according to the 1990 Census was taken and projected at an annual rate of 3.8 percent.

2) Population Served

Current coverage of 43 percent was increased by 7 percent for 1994 and 5 percent annually through 1996 to take into account the increase in supply of 200 LPS from the wells and the start-up of the Regional Treatment Plant. From that point on, coverage was projected as a function of the completion of the network expansion program. Throughout the calculations, a decrease in losses was projected.

3) Water Connections

Needs were obtained by dividing the population served by 4.2 inhabitants per connection.

4) Estimated Annual Consumption – Estimated Consumption/Connection/Month

This was calculated by estimating a consumption of 250 LHD and 4.2 persons per connection.

5) Water Not Accounted For

This percentage was based on the calculations contained in the report prepared by Ing. Arniella.

6) Average Monthly Cost per User

This was obtained by dividing total operating, maintenance and administrative costs plus depreciation of the reappraised fixed assets by the number of connections and then by 12 months.

7) Average Monthly Revenue per User

This revenue figure was adjusted gradually on an annual basis until the figure of S/.10,000 per month was reached, thus covering, in 1998, the average monthly costs per connection (S/.9,989) which, at 1993 prices, are higher.

8) Revenues from the Sale of Water

This was calculated by multiplying the average monthly revenue per user by 12 months and then by the number of connections.

9) Connections and Repairs

Revenue for this item was calculated by multiplying the current average amount (S/.16,500) by the annual increase in connections.

10) Operating Costs and Expenses

This calculation was based on 1991 and 1992 results (in this Annex, see No. 7.2) and all figures are expressed in constant 1993 levels.

10.1 Salaries, Wages and Benefits

For 1993, 1992 figures were increased by 20 percent, followed by an increase of 5 percent in 1994 and 1995. For 1996 and 1997, an increase of 10 percent was applied in order to take into account the hiring of new employees for meter reading and delivery of water bills, as well as maintenance and operations staff. From that point on, an annual increase of 3 percent was used. These calculations also took into account the fact that, by 1995, staff will be reduced by 30 percent as a result of the closing of the La Lucha Plant, which will be liquidated or transferred to the new project.

10.2 Water Treatment Materials

An increase of 40 percent was applied to 1992 levels to obtain figures for 1993 and 1994, with no subsequent increases since water flow will be the same. Following 1995, this cost drops to zero since the La Lucha Plant will no longer be in operation.

10.3 Electricity

The 1993 expense figure was calculated by increasing the 1992 figure by 40 percent. After 1995, this cost decreases by 25 percent as a result of the closing of La Lucha Plant. From that point on, it remains constant since the same amount of electricity will be used.

10.4 Materials and Tools – Maintenance of Equipment and Construction Works

The amount expended in 1992 was increased by 30 percent to obtain the 1993 figure. Subsequent years were calculated by applying an annual increase of 3 percent.

10.5 Fuel and Lubricants

Calculation was performed in the same way as for item 10.2.

10.6 General Expenses

1993 figures were calculated by applying an increase of 40 percent to 1992 figures. Subsequent use was calculated by applying an annual increase of 5 percent.

10.7 Block Water Supply (Regional Plant)

According to information provided by the IEOS, the monthly operating cost should be S/.40 million, which on an annualized basis results in a figure of S/.480 million. With treatment provided at a rate of 1,000 liters per second, the cost per treated cubic meter will be as follows:

$$(1,000 \text{ liters per second} \times 31,536,000) / 1,000 = 31,536,000 \text{ m}^3 \text{ per year.}$$
$$S/.480,000,000 / 31,536,000 = S/. 15.22 \text{ per m}^3.$$

This amount was multiplied by consumption, which was estimated by Ing. Amiella.

10.8 Operating, Maintenance and Administrative Costs for the New Project

The cost figures calculated by Ing. Amiella were used. However, they appear to be slightly high, as a result of which no increase was applied.

When the 200-liter-per-second wells come into operation in 1994, they will generate a cost of US\$491,920 x S/.1,925 = S/. 945,733,250, which will be held constant for 1995, 1996 and 1997.

In 1998, the total amount of costs, including the cost of the pressure filter plant, are as follows:

$$US\$1,316,370 \times S/. 1,925 = S/. 2,534,012,250$$

10.9 Depreciation

In order to calculate depreciation, since fixed assets in operation do not appear on the accounting records, an estimate was made, as shown in No. 7.3 of this Annex.

The calculation was performed as follows:

Estimated value of current fixed assets: S/.7,097,142,313. With an average aliquot of 5 percent per annum (since they are old facilities), a depreciation figure of S/. 354,857 is obtained for 1993.

Figures for subsequent years took into account the closing of the La Lucha Plant and the addition of new construction works as they are completed and placed into operation.

11) Funds Flow

Funds flow calculations were performed as follows:

11.1 Recovery of the Cost of Meters

It was estimated that the installation of water meters will begin in 1996 and that charges will be applied at that time. It is further estimated that 7,500 meters will be installed every six months, meaning that 30,000 will be installed over a period of two years.

11.2 Special Improvement Assessment

It was estimated that this contribution would begin to be applied once construction works are under way, i.e., in 1997. A maximum period of 36 months was used for total payment, although this period could be increased. The calculation was performed in accordance with the results obtained in Chapter 4, paragraph 4.1.2.

11.3 Investments, Financing and Debt Service

Calculations were performed as follows:

INVESTMENTS (amounts in sucres)

	1996 60%	1997 40%	TOTAL 100%
Treatment Plant	3,368,834,700	2,245,889,800	5,614,724,500
Distribution	15,974,227,500	10,649,485,000	26,623,712,500
TOTAL INVESTMENT	19,343,062,200	12,895,374,800	32,238,437,000

FINANCING (amounts in sucres)

	1996 60%	1997 40%	TOTAL 100%
FIM Subsidy 20%	3,868,612,440	2,579,074,960	6,447,687,400
Own Funds 30% ⁽¹⁾	1,700,000,000	7,971,531,000	9,671,531,000
Loan 50%	13,774,449,760	2,344,768,840	16,119,218,600
T O T A L	19,343,062,200	12,895,374,800	32,238,437,000
Total Capitalizable (36% per year)	2,479,400,956	6,273,444,649	8,752,845,605
Loan Disbursement	16,253,850,716	8,618,213,489	24,872,064,205

⁽¹⁾ From recovery of the cost of water meters, special improvement assessments and internal cash generation.

DEBT SERVICE (amounts in sucres)

TOTAL DEBT = Principal + Capitalizable Interest 24,872,064,205 = 16,119,218,600 + 8,752,845,605
DEBT SERVICE: 18 years at 36% per annum with semi-annual payments
Annual Payments of Principal plus Interest = S/. 9,433,449,502

11.4) Fluctuations in Working Capital

Calculations of the fluctuations in working capital were based on the following premises:

a) Current Assets

- For Cash and Banks, 4 percent of expenditures on chemicals, materials, electricity, maintenance and fuel.
- For Accounts Receivable, 25 percent for 1994 and 20 percent for other years, applied to total billings.
- For Inventories, 30 percent of materials, tools and chemicals.

b) Current Liabilities

- For Accounts Payable, 20 percent of expenditures, not including salaries or electricity.

A N N E X N O . 8
METHODOLOGY FOR THE FINANCIAL ANALYSIS OF PROJECTS

METHODOLOGY FOR THE FINANCIAL ANALYSIS OF PROJECTS

1) INTRODUCTION

This document contains a description of the recommended that would make it possible to analyze the financial feasibility of projects as well as the guidelines for calculating the tariff levels necessary to generate a level of revenues which, when combined with other resources such as assessments, transfers, loan proceeds, etc., will ensure the availability of sufficient funds to cover operating, maintenance and administrative costs, debt service and the required investments in construction works and equipment. This will enable the Water and Sewerage Enterprise to operate on a solid financial footing based on true cost recovery and thus attain financial self-sufficiency.

2) ANALYSIS OF PROFITABILITY AND OF THE NECESSARY TARIFFS

In analyzing and calculating tariff levels, the self-financing criterion should be kept in mind. Accordingly, the average tariff level should cover the real cost of providing services and also provide a surplus that will facilitate financing of the enterprise's expansion programs. This surplus is calculated as a function of a profitability rate, which is defined as the ratio between net operating revenues and the average annual value of current and projected net reappraised fixed assets.

3) FINANCIAL ANALYSIS CONSIDERATIONS BASED ON THE PROFITABILITY CRITERION

It must be kept in mind that the mere fact of establishing a profitability rate will not necessarily ensure financing for reasonable levels of investment or coverage of debt service that in any given period will be necessary to satisfy a given level of demand. Accordingly, the following considerations should be taken into account in analyzing tariff levels based on the profitability criterion:

- In order to set profitability at rational levels, appropriate criteria are applied for estimating the value of the enterprise's fixed assets in operation, since this amount will depend not only on historic cost (purchase price), which involves an analysis of local and foreign currency components, but also of the current replacement cost of those assets, i.e., the reappraised value of the assets, consisting of those currently in operation plus those to be added during the implementation phase of the new project.

It is not surprising that administrative mistakes and the lack of institutional experience lead to the design and implementation of oversized projects having costs much greater than required, especially in construction projects built in marginal neighborhoods where solutions for service demand for have not yet been designed and implemented on the basis of low-cost projects, thus transferring to the users the cost of such administrative and technical failures, with the result that it is sometimes almost impossible to recover those costs, thus rendering the projects financially unfeasible.

In addition, in order for projects to be financially feasible, it is necessary to take into account the ongoing innovations in certain technical areas that have brought about cost reductions that should be reflected when assets are projected.

- Likewise, the level of depreciation, which depends primarily on the level of assets and their probable obsolescence rates, is plagued, in terms of time and technology, by the same problem analyzed above, i.e., that projects are oversized, their costs are too high and as a result depreciation is also high. Or, alternatively, in many cases no reliable information is available in this regard.
- Another consideration to be taken into account is that the net revenues to assets ratio is not applicable in certain extreme cases, since in small systems where assets have been almost totally depreciated they can generate high rates of profitability even though revenues are insufficient to satisfy needs.

4) ANALYSIS OF THE TARIFF LEVELS REQUIRED TO ENSURE THE FINANCIAL VIABILITY OF PROJECTS BASED ON THE CASH FLOW CRITERION

Based on the above, it becomes essential to conduct financial evaluations of projects in order to determine tariff levels based not only on the profitability criterion but also on cash flow analysis, which will also make it possible to automatically ensure the existence of an acceptable financial statement, maximum cost recovery, coverage of debt service, and system expansion needs.

In addition, it constitutes a sound principal of orderliness with regard to the timing-programming-control process within the enterprise and also leads to a determination of the maximum level of institutional debt and as instrumental in attaining financial self-sufficiency.

Advantages of Financial Analysis Based on the Cash Flow Criterion

Financial analysis based on the cash flow criterion has the following advantages:

- It is oriented toward systematic institutional planning because it is based on a primary objective, which is to satisfy a specific level of demand by means of a well-defined project and, in addition, clearly demonstrates the relative benefits that come from satisfying that level of demand.
- It allows the management staff of the enterprise to make decisions and formulate practical and concrete recommendations with regard to levels of current expenditures in order to ensure the appropriate operation and maintenance of all systems.
- It makes it possible to conduct a systematic analysis of the payment capacity of users (by means of well-designed surveys and the appropriate evaluation of results) in order to ascertain the structure of the family budget, which in turn leads to more equitable tariff structures, for example, by complying with the recommendations of such international organization as the World Health Organization (WHO), which suggests the application of the equivalent of the basic daily minimum wage prevailing in the area for every twenty cubic meters of monthly water consumption by the poorest population segments.

- It makes it possible to compute a rational approximation of the necessary levels of indebtedness, because loans provide the means to finance construction works, since the credit mechanism makes it possible to spread over a long period of time capital expenditures incurred in very short interval vis-a-vis the useful life of the projects.
- Consequently, a positive cash flow will provide the necessary rates of profitability for the system, together with current information on assets and accumulated depreciation. In addition, the rate of profitability can be used as a financial index for medium- and large-sized enterprises.
- Finally, this procedure by itself adequately organizes the information necessary for analyzing cost recovery in general and, accordingly, for conducting financial evaluations of projects.

In order to facilitate an understanding of the methodology for conducting financial analyses of projects and establishing tariff levels based on real prices, as well as cost recovery, a detailed and schematic explanation is provided below of the various steps involved in the analysis which combine (as required) the criteria of profitability and cash flow (or cash balance), which serve to establish the needs for resources, the necessary tariffs as a function of the payment capacity of users, and the financial feasibility of the projects and their impact on the finances of the enterprise.

5) EXPLANATION OF THE STEPS INVOLVED IN THE ANALYSIS

Calculations are performed for each of the years of the period in question, with the base year being defined as the last year of the economic cycle, with a projection no greater than ten years.

In each of the steps involved in the analysis, explanatory tables are included to facilitate understanding.

- To begin, operating, maintenance and administrative expenses, including those that would be incurred when the new project is placed into operation, are evaluated and projected over the period in question. All of these expenses will be identified with the letter "G".

Table No. 1

Operating, Maintenance and Administrative Expenses,
Current and Future Project (G)

DESCRIPTION OF EXPENSES	BASE YEAR	1	2	3	...	YEAR 10
OPERATING AND MAINTENANCE ADMINISTRATIVE ADMINISTRATIVE, OPERATING AND MAINTENANCE FOR THE PROJECT						

- A calculation is made of the reappraisal value of all of the assets in operation as well as of those that will be added during the period in question. This reappraisal is conducted by selecting a representative index for updating the cost of the assets. The reappraised value of the assets will be represented by the letter "A".

Table No. 2

Net Reappraised Assets (A)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
NEWLY APPRAISED ASSETS						

- We calculate the value of the depreciation on the reappraised assets in accordance with the years of useful life established for individual groups of assets. The amount of depreciation for each of the years in the period in question is identified with the letter "D".

Table No. 3

Depreciation of Reappraised Fixed Assets (D)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
DEPRECIATION OF REEVALUATED FIXED ASSETS						

- For all outstanding loans (if any), debt service (principal + interest) is calculated and we identify it as "SD".

Table No. 4

Debt Service (Outstanding Loans, If Any) (SD)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
AMORTIZATION (a)						
INTEREST (b)						
DEBT SERVICE (c) = a + b						

- It is recommended that a profitability rate, "R" be set, which will depend on the particular criteria to be adapted (for example, 5 percent of the average value of the net reappraised fixed assets).
- We also calculate other revenues, separately from those generated from the application of tariffs or the sale of services, and we call them "OI". Neither transfer revenues nor revenues from credit proceeds should be included here.

Table No. 5

Other Revenues (OI)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
OTHER REVENUES (detailed breakdown)						
—						
—						
—						

- Once the values for the preceding periods have been established and the rate has been set, we proceed to determine the level of revenues from the sale of services, "VS", that will cover costs (expense-covering tariffs) and generate the level of profitability established (profit-producing tariffs), i.e.:

$VS = G + D + R.A - OI$, where R.A is the value obtained by multiplying the rate of profitability "R" by the value of the net reappraised assets ("A"). This calculation does not include debt service (if any), which will be included subsequently to obtain cash balance. In addition, the sum of the depreciation of the reappraised assets plus the level of profitability is normally greater than the debt service.

Table No. 6

Calculation of the Level of Revenue Necessary (VS)

$$VS = G + D + R.A - OI$$

DESCRIPTION	BASE YEAR	1	2	3	...	YEAR 10
Operating and maintenance expenses (G)						
+ Administrative expenses (G)						
+ Administrative, operating and maintenance expenses for project (G)						
+ Depreciation (D)						
+ Surplus for expansion (R.A)						
- Other revenues (OI)						
<hr/>						
= NECESSARY REVENUES FROM SALE OF SERVICES (VS)						

- Once the level of revenue has been obtained, the next step consists of analyzing the potential payment capability of the users, "P", in order to compare it to the level of income from the sale of services, i.e., to establish whether it is possible for users to generate the level of revenue established.

If $VS - P$ is positive, it means that payment capacity is lower than expected revenues and accordingly it is feasible to reduce the rate of profitability R until a balance is achieved between VS and P . If $VS - P$ is negative or 0, it indicates that payment capacity is greater than or equal to the expected revenues from the sale of services and that we may now proceed to the next step.

Table No. 7

Comparison Between Payment Capacity and Required Level of Revenue

DESCRIPTION	BASE YEAR	1	2	3	...	YEAR 10
PAYMENT CAPACITY (P)						
DIFFERENCE BETWEEN VS - P = POSITIVE						
REDUCE R UNTIL :						
VS - P = NEGATIVE, OR						
VS - P = 0						

- Establish the tariff structure that will generate the necessary revenue "VS" and profitability "R".

Table No. 8

Tariff Structure

DESCRIPTION	BASE YEAR	1	2	3	...	YEAR 10
SALES (M ³)						
TARIFFS						
- Total Revenue in Sucres (US)						
- Average Tariff in Sucres/M ³						

- Projection of the volumes to be billed during the period in question, both current and including the projects to be implemented.
- From this stage on, we proceed to analyze cash flow, i.e., investments to be made in construction projects with available resources "RD" are established by adding to that figure current loan proceeds "C" (if any) and Special Improvement Assessments "CM" (if any), as follows: Available Resources: $RD = (VS - G - SD + OI) + C + CM$

Table No. 9

Available Resources (RD)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
Revenue from the Sale of Services (VS)						
- Administrative, operating and Maintenance expenses (G)						
- Debt service (SD)						
+ Other revenue (OI)						
+ Current loans (C)						
+ Special improvement assessments (CM)						
<hr/>						
= AVAILABLE RESOURCES (ID)						

- We obtain from the Project Area of the enterprise the duly prioritized Investment Program, to be called "I" for the period in question, necessary to satisfy current and potential demand and thus achieve appropriate coverage of a given population segment over a given period of time.
- On the basis of the investment program, we calculate the cash balance "CB" for the period in question in order to determine whether it will be possible, using available resources, both own resources as well as current loans and special improvement assessments, to take on to the investments, as follows:

$$BC = RD - I$$

Table No. 10

Cash Balance (BC)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
Available Resources (RD)						
- Investment Program (I)						
<hr/>						
= CASH BALANCE (BC)						

- If the cash balance generates a surplus or is equal to 0, the profit-generating tariffs that have been calculated are sufficient and the construction projects can be implemented. In the event that the cash balance shows a deficit, we proceed to the following step.
- We determine what portion of the investment implementation deficit can be financed with new loan resources "C1" (see Table No.11).
- Once we have determined which portion of the deficit can be financed by new loans, we calculate debt service for the potential new loan and call it "SD1" (see Table No. 11).
- We then proceed to calculate the new cash balance "BC1", as follows:

$$BC1 = RD + C1 - (I + SD1)$$

Table No. 11

New Cash Balance (BC1)

DESCRIPTION	BASE YEAR	1	2	3	YEAR 10
Available Resources (RD)						
+ New Credit (C1)						
- Investment Program (I)						
- Debt Service on New Credit (SD1)						
<hr/>						
= CASH BALANCE (BC1)						

- If the new cash balance is in equilibrium or shows a surplus, it indicates that the tariffs originally calculated are sufficient and the construction projects can be carried out. However, if the cash balance again shows a deficit despite a potential new credit, we proceed to the following step.

- We calculate the revenues necessary to cover the deficit and implement the construction projects on the basis of additional revenue from the sale of services "VS1", as follows:

$$VS1 = VS + BC1$$

which indicates that to the revenue initially calculated on the basis of the sale of services we add the cash deficit and obtain the revenue necessary to meet it.

- Once we have obtained the new level of revenue from the sale of services, it should be compared against the potential payment capacity of the users "P". If $VS1 - P$ is negative or 0, it indicates that payment capacity is greater than or equal to the new revenue expected and accordingly the tariff structure can be adjusted to generate revenues on the magnitude of VS1 as described in paragraph 5.9 and Table No.8. But if $VS1 - P$ is positive, it means that the payment capacity is less than the revenue required and accordingly we proceed to the final step.
- As a last resort, a request is submitted to the government for a capital transfer equal to the difference between VS1 and P, and a new tariff structure is designed that will generate revenue equal to "P". If it is not possible to obtain government resources, then investments must be reduced by an amount equal to the difference between $VS1 - P$.

Table No. 12

Requirements for Transfers or Investment Reductions

DESCRIPTION	BASE YEAR	1	2	3	...	YEAR 10
Government Transfer in an Amount Equal to $VS1 - P$						
New Tariff Structure to Produce Revenues = P						
Reduction of Investments by an Amount Equal to $VS1 - P$ if There are No Government Transfers						

A N N E X N O . 9
L I S T O F I N D I V I D U A L S I N T E R V I E W E D

LIST OF INDIVIDUALS INTERVIEWED

USAID/ECUADOR

Dr. S. Ken Yamashita	Chief of the Health and Family Planning Division, Multisector Office
Mr. Patricio Murgueitio	Health and Family Planning Division, Multisector Office
Mr. Sonny Low	RHUDO/SA
Ing. María Augusta Fernández	RHUDO/SA
Ing. Adalid Arratia	Project Coordinator

IEOS, QUITO

Ing. Diego González	Project Manager, IEOS/USAID
Ing. Jorge Zurita Barona	National Director of External Loans

IEOS/MACHALA

Ing. Nelson Aguilar	Director of the Regional Treatment Plant Project
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MACHALA

Dr. Mario Minuche Murillo	Mayor of Machala
Ing. Com. Luis Montaña Soto	Central Bank of Ecuador, Machala Branch
Ing. Wilmer Encalada	Director of the Municipal Office of Planning and Projects
Ing. Richard Añazco Dávila	Director of the Water Department
Ing. Leonardo Calle V.	Director of the Municipal Financial Department
Ing. Emilio Garzón	General Accountant for the Municipality
Mr. Carlos Alvarado	Head of the Sewerage Section
Mr. Jaime Mason	Head of the Appraisals and Cadaster Section
Ing. Eugenio Montenegro	Head of the Revenues Section
Mr. Félix Ceballos	Head of the Computer Operations Section