



# Water and Sanitation Program

An international partnership to help the poor to gain sustainable access to improved water supply and sanitation services

## GLOBAL SMALL TOWNS WATER AND SANITATION INITIATIVE

*Comparative study of the water and sanitation services management models in the small towns of the developing countries*

### *Colombia Case Study*

## *Preliminary findings – Draft paper*

### **Introduction**

*In 1999, the World Bank Rural Water Supply and Sanitation Thematic Group (RWSTG) and the Water and Sanitation Program (WSP) began a joint global initiative to document management models for water supply and sanitation services in small towns. The main objective of the global Initiative is to improve knowledge of "small towns" – a new field in that until only a few years ago governments and development agencies had focused only on rural or urban areas.*

*Among other activities (study tours, e-conferences, workshops...), four country case studies are being carried out in the framework of the Global Initiative : in Mauritania, Viet Nam, Benin and Colombia.*

*In this report, some of the main findings and lessons learned from the Colombia case study are presented. The case study has been carried out since December 2000 by the consulting company Proconsúl, contracted by the Water and Sanitation Program "Andean Region" office, with technical assistance by Hydroconseil.*

*The geographical focus of the case study is the Department of Antioquia, where Proconsúl has made an in-depth analysis in 10 municipalities, representing various W&S management models. The main reason for having chosen Antioquia is that this Colombian Department is experiencing a new management model involving both public and private sectors in 38 municipalities, which represents a meaningful scale.*

**Carmen Arevalo Correa, Ph.D.**  
Regional Manager, Water and Sanitation Program



This study has been carried out by:

**PROCONSÚL**  
PROFESIONALES CONSULTORES **C.T.A.**

Carrera 34 # 7-63 – A.A. 9736, Medellín, Colombia  
Tel. (574) 311 82 75 – Fax (574) 312 36 60  
E-mail: [proconsul@epm.net.co](mailto:proconsul@epm.net.co)

With methodological assistance by:

**HYDROCONSEIL**

198, chemin d'Avignon,  
84470 Châteauneuf de Gadagne France  
[www.hydroconseil.com](http://www.hydroconseil.com)



### **Water and Sanitation Program (WSP)**

Andean Regional Office: World Bank Resident Mission in Peru  
Avenida Pardo y Aliaga # 640, Of. 503 – Lima 27 – San Isidro – Lima  
Tel: (51-1) 222-5277 – Fax: (51-1) 222-2877

# 1. Colombia overview

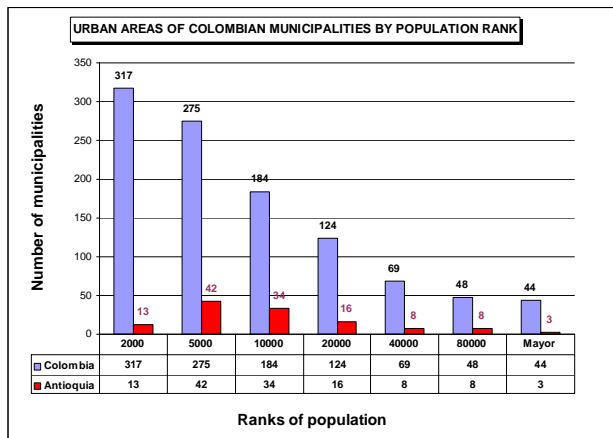
## 1.1. Socio-economic basic data

The box to the right summarizes basic socio-economic data for Colombia and the Colombian water and sanitation sector. In general, Colombia can be characterized as quite an urbanized country, that for several years has experienced a strong phenomenon of economic recession. It is expected that this trend will reverse in 2001, with the GDP growth rate expected to be 2,5% – 3,8% according to the IMF).

In conclusion, national poverty indices indicate a high concentration of income amongst a few more wealthy people, the deterioration of income of the poorest, a deterioration of equity indicators over the last few years, and a general improvement in indicators for Unsatisfied Basic Needs.

## 1.2. Small towns in Colombia

In Colombia, “small towns” do not appear as an administrative entity. The best definition for “small towns” is what in Colombia is called “cabeceras municipales”, which represent the urban area of each municipality. In the following pages of this document these concepts will be clarified.

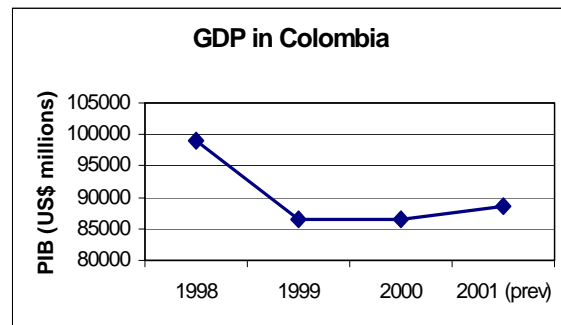


The definition we have used in this case study is based on the global initiative definition - a small town is big enough to justify “modern” water supply and sanitation equipment, but not big enough to interest a urban and formal utility that provides water and sanitation services to 200,000 habitants or more.

Following this definition, a small town in Colombia appears as a town with a population of between 2,000 and 80,000 inhabitants (80,000 has been chosen because it seems to be a breakpoint in population distribution – at least in Antioquia).

### Colombia at a glance

|                                |                           |
|--------------------------------|---------------------------|
| Surface .....                  | 1.141.748 km <sup>2</sup> |
| Population (est. 2000).....    | 42,3 millions             |
| Urban / rural population ..... | 71% / 29%                 |
| Population growth rate.....    | 1,8% (1995-2000)          |
| Administrative levels .....    | 32 departments            |
| .....                          | 1062 municipalities       |



|                            |           |
|----------------------------|-----------|
| GDP per capita (2000)..... | 2045 US\$ |
| GINI coefficient .....     | 0,54      |
| Unemployment.....          | 20,4%     |
| NBI index* .....           | 26%       |

### Water and Sanitation

|                               |       |
|-------------------------------|-------|
| % of W&S sector in GDP .....  | 0,66% |
| Percent of population with... |       |
| Access to Safe Water .....    | 76%   |
| Rural.....                    | 44%   |
| Urban .....                   | 91%   |
| Access to sanitation .....    | 64%   |
| Rural.....                    | 37%   |
| Urban .....                   | 82%   |
| Micro metering .....          | 77%   |
| Macro metering.....           | 60%   |
| Unaccounted for Water.....    | 41%   |

\* : NBI: Necesidades Básicas Insatisfechas, Unsatisfied Basic Needs

Sources: National Planning Department, World Bank and UNDP annual reports.

For Colombia and Antioquia, population data is as follows:

|                  | NUMBER OF MUNICIPALITIES (%) |            | URBAN AREAS POPULATION (%) |            |
|------------------|------------------------------|------------|----------------------------|------------|
|                  | Colombia                     | Antioquia  | Colombia                   | Antioquia  |
| 0 -2.000         | 30                           | 10         | 1                          | 0          |
| 2.000-10.000     | 43                           | 61         | 7                          | 10         |
| 10.000-80.000    | 23                           | 26         | 21                         | 23         |
| More than 80.000 | 4                            | 3          | 71                         | 67         |
| <b>TOTAL</b>     | <b>100</b>                   | <b>100</b> | <b>100</b>                 | <b>100</b> |

As we can see, of 1062 municipalities in Colombia, only 4% (which represents 44 municipalities) have more than 80,000 inhabitants. In Antioquia Department, only 4 municipalities (3%) can be considered as “big cities”. For the urban areas of municipalities, we can observe that what we call “small towns” in this case study represents 28% of the urban population (33% in Antioquia).

### 1.3. Water and Sanitation facilities in small towns

A majority of the Colombian small towns use surface water for the schemes, since Colombia is quite a water-rich country (mountainous over a wide part of the country and with plenty of rainfall). Water is treated in conventional water treatment plants, which ensures quite low production costs. In a few cases (seaside towns or areas with a flat topography), pumping stations are used. Almost all the urban areas of more than 2,000 inhabitants are equipped with a piped water distribution system.

Sewerage schemes are gravity-fed and combined - rainwater and wastewater are not separated. Very few cities are able to treat wastewater before discharging it to a river in most of the cases. There are very few standpipes in the small towns, mostly just for emergency situations. The standard service is a house connection, with a very high coverage level (around 90% in most cases).

### 1.4. Legal framework: Law # 142

Domiciliary public services in Colombia are based upon the new Constitution (approved in 1991) and Law # 142, approved in 1994. The two main principles of the mentioned texts are: decentralization of responsibilities to municipalities and increased private sector participation – two major changes compared to the situation that existed before 1994.

Law # 142 defines the status of Public Service Utilities (*Empresa de Servicios Públicos*, ESP). An ESP is a share-holding company, which can be “official” (meaning public), “private” or “mixed” (public-private), according to the level of private sector participation (respectively, 0%, more than 51%, and less than 50%).

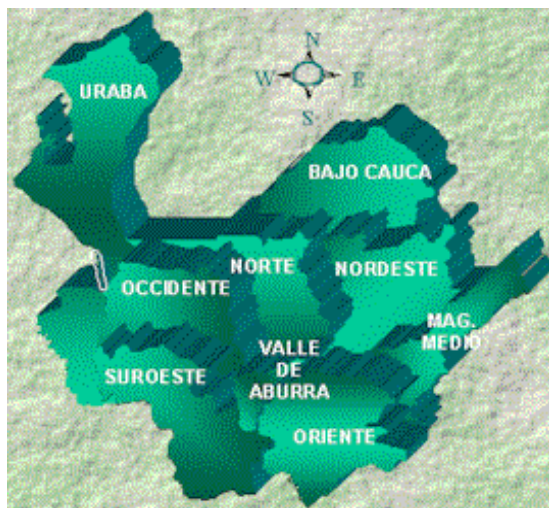
According to the law, municipalities are responsible for providing public services, directly or by delegating to an independent utility. In the case that a municipality wants to provide services directly, it has to prove that no company is interested in providing these services. The same law promotes competition between companies and the disappearance of monopolies.

At the very least, Law # 142 created the public services regulatory body, whose name in Spanish is “*Superintendencia de los Servicios Públicos Domiciliarios*” (SSPD) – which is not focused solely on W&S services. Standards for W&S services management (including tariffs) are defined by the CRA (Regulatory Commission for Drinking Water and Basic Sanitation).

There is no specific provision for small towns in the existing legal framework. Only a slight difference appears in the way to calculate service tariffs when a utility has less than 8,000 clients.

**1.5. Main stakeholders of W&S services in small towns**

| Stakeholder   | Function   | Responsibility  | Observations, trends & prospects  |
|---|--|---|---|
| <b>STATE (President, Ministries of Economic Development, Health, Construction and Planning)</b> | Define policies and plan programs. Provide directly services in some cases.  | Support municipalities and replace it in case of deficiency. Transfer financial resources to municipalities.                    | Difficulties for lacking of resources. The Minister of Economic Development directs CRA as a representative of President.         |
| <b>DEPARTMENT (Water Unit)</b>  | Support & coordinate ESP and municipalities which directly provide services.   | Financial, technical and administrative   | Little capacity for lacking of financial resources.   |
| <b>MUNICIPALITY</b>   | Define layers, give subsidies (if necessary), organize community participation and ensure that service is correctly provided). | Contract ESP or demonstrate that a service provided directly by municipalities could have an interest. Create Solidarity Funds. | In the smallest towns service appears to be unprofitable. The main concern for municipalities is to gather money for investments. |
| <b>CRA (Regulation Commission for Drinking Water and Basic Sanitation)</b>                      | Promote competition, regulate monopolies, define tariffs calculation.  | Order transfer, fusion and liquidation of ESP (when they are proved to be unable to provide services in a satisfying way)       | Adapted standards are missing for small towns. Members of the CRA are designated by law and by the president                      |
| <b>SSPD (Regulation Body for Domiciliary Public Services)</b>                                   | Control the ESP operations and users participation.  | Control contracts, the ESP. Decide sanctions or intervention when ESP don't meet standards.                                     | Difficulties in respecting the law. The president of Republic chooses the Superintendent.   |
| <b>FINDETER (Territorial Development Financing Agency)</b>                                      | Promote regional development by financing and advising projects presented by municipalities.                                   | Loan money to municipalities and official ESP, for W&S projects (among others).   | The main shareholder is the Nation (85%), all departments (like Antioquia) also are shareholders.                                 |
| <b>DEVELOPEMENT AND SOCIAL CONTROL COMITES (Users board)</b>                                    | Control the ESP and collaborate with users. Elect the "Users representatives".   | Propose plans, programs and community investments.  | Little political interference.  |
| <b>VOCALES DE CONTROL (Persons)</b>   | Participate in Board of Directors of public ESP.   | Is a link between ESP and users. Collects complains and propose solutions.  | Idem as above.  |



**1.6. Case study focus zone: the Department of Antioquia**

Some figures about Antioquia department:

- 125 municipalities
- 63.612 km<sup>2</sup> (5.6% of Colombia)
- Total population: 5.4 millions
- Urban population: 3,9 millions (1,9 millions in Medellín, the department capital)
- Rural population: 1,5 millions.

In terms of population distribution, density, water and sanitation facilities, socio-economic parameters, Antioquia is quite representative of Colombia.

In urban areas, the population with access to safe water is estimated to be 97%. However, if the Aburra Valley (Medellín and the 10 municipalities in the neighborhood), where EPM (Medellín Public Utility) provides the service, is not considered, the figure is only 91% (the national average for urban areas).

The main reason for having chosen Antioquia is the presence of 11 private operators, managing water and sanitation services in 38 municipalities – much more than the national average.

In the case study, after a detailed analysis of 30 municipalities, 10 of them have been selected, whose urban area population is between 2,000 and 80,000 inhabitants. The logic in choosing this sample of 10 municipalities was to respect population ranking, the proportion of existing contractual arrangements in the Department, and the quality of services:

| Municipality | Urban area (km2) | Estimated population for 2000<br>Inhabitants | Operator |                   | Service quality (1) |       |       | Security |         |
|--------------|------------------|--|----------|-------------------|---------------------|-------|-------|----------|---------|
|              |                  |  | Name     | Model             | Cov.                | Cont. | Qual. |          |         |
| 1            | Hispania         | 0,2  | 2 511    | Municipio         | Municipal           | OK    | OK    | OK       | Bad     |
| 2            | San Jerónimo     | 0,5  | 3 094    | A. de S.J. (2)    | EICE                | OK    | OK    | OK       | Good    |
| 3            | San Vicente      | 1,7  | 5 439    | Municipio         | Municipal           | OK    | OK    | OK       | Regular |
| 4            | Jardín           | 1,0  | 7 168    | Ingeniería total  | Private             | OK    | OK    | OK       | Good    |
| 5            | Amaga            | 1,5  | 11 324   | Municipio         | Municipal           | OK    | OK    | OK       | Good    |
| 6            | Marinilla        | 2,9  | 22 794   | Conhydra          | Private             | OK    | OK    | OK       | Good    |
| 7            | La Ceja          | 4,5  | 32 097   | EEPP de La Ceja   | EICE                | OK    | OK    | OK       | Good    |
| 8            | Turbo            | 11,9   | 43 908   | Conhydra          | Private             | OK    | OK    | OK       | Regular |
| 9            | Rionegro         | 10,0   | 54 837   | Aguas de Rionegro | Mixed               | OK    | OK    | OK       | Good    |
| 10           | Apartado         | 6,7  | 75 522   | Presea S.A.       | Private             | OK    | OK    | OK       | Regular |

(1) Information source: *Superintendencia de Servicios Públicos Domiciliarios*.

(2) Aguas de San Jerónimo.

### 1.7. Existing management models for small towns

In Colombia the bodies that can provide services in small towns are:

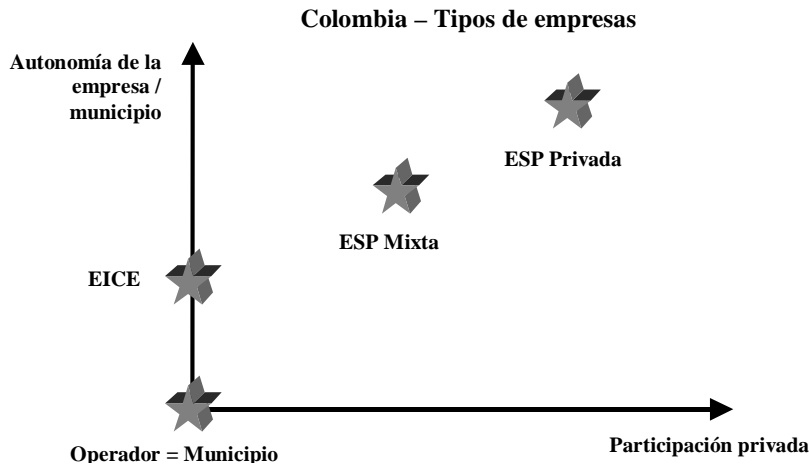
- Municipality (directly, without any independent utility).
- EICE (*Empresas Industriales y Comerciales del Estado* – Industrial and Commercial State Companies), evolving from public utilities that provided services before 1994.
- ESP (*Empresas de Servicios Públicos*) – Official (public), private or mixed.

Proportions of these models in Colombia are:

| OPERATORS    | COLOMBIA<br>(sample of 411) |            | ANTIOQUIA  |            |
|--------------|-----------------------------|------------|------------|------------|
|              | Municip.                    | %          | Municip.   | %          |
| ESP Official | 3                           | 1          | 0          | 0          |
| ESP Private  | 10                          | 2          | 38         | 30         |
| ESP Mixed    | 12                          | 3          | 1          | 1          |
| EICE         | 193                         | 47         | 30         | 24         |
| Municipality | 193                         | 47         | 56         | 45         |
| <b>TOTAL</b> | <b>411</b>                  | <b>100</b> | <b>125</b> | <b>100</b> |

In the 411 municipalities sample studied by SSPD one can observe a distortion that tends to underestimate the number of private ESP in Colombia – which are more than 2%.

In general, in **Colombia the prevailing model for W&S in small towns is the “communal” one**, which represents more than 90% of cases (EICE + Municipality).



*Management models in Colombia, classified by using the following criteria:*

- *Autonomy of the utility from the municipality*
- *Level of private sector participation in the utility.*

## 2. Management arrangements for W&S in small towns

### 2.1. The case of Acuantioquia and the theme of schemes ownership

Before 1994, in most cases (with the exception of Antioquia and the Cauca Valley), W&S services were provided directly by the municipalities. From this we can conclude that in most cases facilities (pumping systems, treatment plants, tanks, piped schemes...) are owned by municipalities.

In cases where the municipalities have created an EICE (this is the case, for instance, of La Ceja and San Jerónimo), they transfer the ownership of the schemes to this EICE. A specific case is Rionegro, where a mixed ESP was created. In this town the infrastructure has not been transferred, but leased to the EICE by the municipality.

Acuantioquia is also a specific case, because this public utility owned the W&S infrastructures and operated the service in 40 municipalities of Antioquia. In 1996 the Department (main shareholder of Acuantioquia) decided to initiate the liquidation process. At the beginning, Acuantioquia sold 2 systems to municipalities, who started to directly manage the services. In 1996 and 1997, through an invitation to tender, Acuantioquia delegated the services management to 8 private operators, retaining the responsibility for renewing systems. In fact the municipalities haven't been involved in the choice of the type of contract and the selection of the operator. At the beginning of 2001 Acuantioquia is still in the process of liquidation.

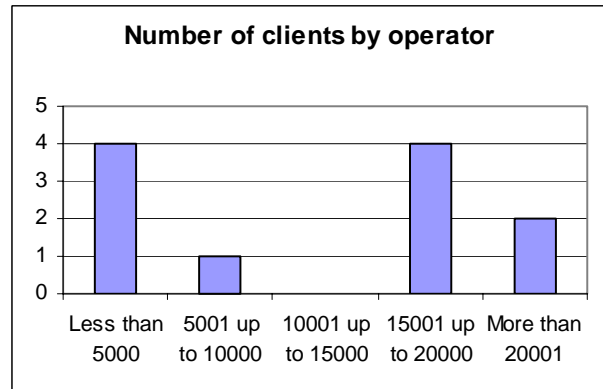
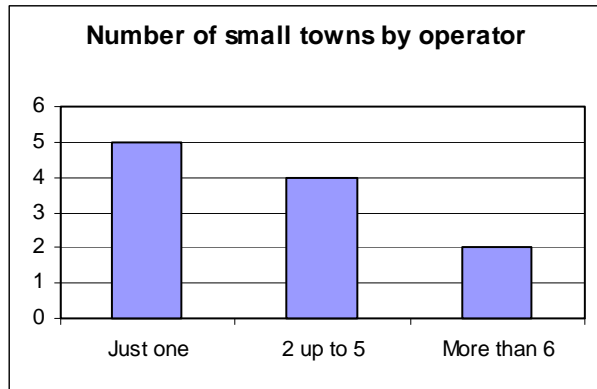
#### **Montería, the only case of real “concession” in Colombia**

Montería is the chief town of Córdoba Department, with an estimated population of 320,000 persons. In this “small” town W&S services have been delegated to a private operator, after an international bidding process. Services were conceded to a french, colombian and spanish consortium (*Proactiva Aguas de Montería S.A. ESP*), with a 20 years contract. Before this only 70% of inhabitants had access to safe water in Montería and 25% to sewerage, with a very poor quality of service. To support investments the Municipality and the State are engaged to bring US\$ 28 millions and US\$ 4 respectively. The consortium is engaged to bring US\$ 8 millions. The targets in terms of service improvement is to reach a 90% for safe water and 80% for sewerage, within 20 years.

The municipality of Montería had been chosen by the Colombian government as a “pilot project for Water and Sanitation sector privatization”, since 1996. But the contract has been signed only at the end of 1999, and the new provider began in January of 2000.

## 2.2. Private operators in the Department of Antioquia

In the Department of Antioquia, 11 private operators provide W&S service in 38 small towns, which represents 145,000 clients, or 53% of people living in urban areas of the Department (with the exclusion of Aburra Valley, where services are provided by Medellín Public Utility).



Considering a sample of 5 private operators, managing 31 small towns (25% of the Department of Antioquia), which each represent between 5,000 and 45,000 clients, the key points are as follows:

- These operators are limited companies, created in response to the invitation to tender launched by Acuantioquia, and their capital lies between US\$ 10,000 and US\$ 250,000.
- Each operator manages a head office (generally in Medellín) and a small team in each of the cities for which they are responsible. This allows economies of scale in functions such as invoicing, accounting, buying of spare parts, inventories, etc.
- One of the interests of these private operators is that they bring engineering and management know-how that a “municipal” utility couldn’t afford easily.
- In terms of financial management, the private operators hold separate accounts for each small town that they manage, and a joint account for their complete activity.

## 2.3. Private operators only have a delegated management contract

The main points of the contracts signed between Acuantioquia and the private operator are:

|                                       |  |
|---------------------------------------|--|
| <b>Subject</b>                        | Operation, administration and maintenance of W&S services in urban areas.  |
| <b>Operator remuneration</b>          | From 10% to 15% of the collected money.  |
| <b>Contract duration</b>              | 15 years (except one of them, which is a 5 year renewable contract)  |
| <b>Destination of collected money</b> | Administration and O&M costs, taxes, operator remuneration, debt servicing (in the case in which the municipality has taken a loan to finance investments).  |
| <b>Surplus of money</b>               | This surplus is supposed to be transferred to Acuantioquia, who will devote part of it to the payment of technical audit and to a “renewal and extension fund” (which doesn’t exist for the moment).       |
| <b>Schemes ownership</b>              | Acuantioquia, who currently covers 32 municipalities. The total value of these 32 schemes is evaluated to be US\$ 18,500,000 (year 2000). Acuantioquia was able to sell 8 of 40 schemes to municipalities. |
| <b>Contractual audit</b>              | Sporadically made by Acuantioquia. No financial audit of operator is planned for.  |
| <b>Exit of the contract clauses</b>   | In fact, there is no clause in the contracts that could allow Acuantioquia to terminate a contract in a unilateral manner.   |
| <b>Operator risks</b>                 | Payment of the service by the users and definition of the tariffs.   |

Source: interview with Acuantioquia, Dr. Carlos Molina, Official liquidator

## 2.4. The example of Marinilla

Among all the municipalities where W&S services are managed by a private operator, Marinilla (whose operator is Conhydra) is one of the most interesting, because of some distinctive innovations:

- At the beginning there was a strong balance of opinion against “privatization”, from the municipality as well as from the inhabitants. The citizens of Marinilla didn’t accept the idea that a contract for W&S services could be signed without their assent.
- Considering this situation, the director of Conhydra decided to face the “opponents” to the contract. Discussions between the private operator, the users’ representatives and the municipality led to a mutual arrangement that induced changes in the terms of contract – for example, the duration of the contract was reduced from 15 to 5 years. A Committee was created, gathering the director of Conhydra, the mayor, several municipal secretaries and a representative of the users, in order to monitor the contract and the realization of specified goals (coverage rates, etc).
- This mutual understanding made it possible for the operator to improve the service indicators considerably, in terms of coverage, continuity, and water quality. To illustrate this point, it is worth mentioning that Conhydra increased the number of clients in Marinilla from 5,880 in 1997 (beginning of the management contract) to 7,106 in 2000, which represents an increase of 21% in 3 years.
- Another interesting and innovative arrangement made by Conhydra is the technical assistance that the operator provides to the municipality to plan, finance and execute a masterplan, including renewal of the oldest parts of the piped scheme, construction of a wastewater treatment plant, and expansion of the service to new clients.
- It appears that one of the key reasons for success in Marinilla is the very good relationship that now exists between the private operator, the municipality and the users. Conhydra, for instance, often come to present W&S services main achievements in front of the municipal council.

**Marinilla – A few indicators of operator performance**

|  | March 1997  | 1999   | 2000 (est.) |
|--|-------------|--------|-------------|
| <b>Population</b>                                    | Unavailable | 25,280 | 26,070      |
| <b>Number of house connection</b>                    | 5,880       | 6,754  | 7,106       |
| <b>Access to safe water (%)</b>                      | 94%         | 98%    | 99%         |
| <b>Access to sewerage (%)</b>                        | 85%         | 88%    | 90%         |
| <b>Meters coverage (%)</b>                           | 84%         | 93%    | 100%        |
| <b>Water production (in millions of m3 per year)</b> | 2,0         | 2,06   | 2,12        |
| <b>Unaccounted for water (%)</b>                     | 46%         | 41%    | 35%         |
| <b>Service continuity (% of hours per day)</b>       | 83%         | 100%   | 100%        |
| <b>Average consumption (m3 per month)</b>            | Unavailable | 15     | 15          |

Source : Interview with Conhydra and working paper by Daniel Rivera, 2000.

## 2.5. National strategy: utilities modernization and rise of private participation

Since 1995, the strategy of the Ministry for Economic Development (in charge of water and sanitation services in the whole country) has followed two directions: modernization of small W&S utilities (through the PME, *Programa de Modernización Empresarial*), and an increase of private sector participation. The project is funded by the World Bank and is being approved for a new period of 9 years.

The Ministry is also promoting the “*Constructor-Operador*” model, in order to increase private participation in small towns: the municipality contracts a firm to execute the works and the same firm is then responsible for service management and operation. Significantly, the private firm doesn’t bring money, which is a big difference with – for example – a BOO contract. This kind of arrangement will be applied to 9 small towns of less than 10,000 inhabitants, for a total estimated investment of US\$ 4,55 millions.



## 3. Coverage, service affordability and user's satisfaction with the service

### 3.1. Coverage rates, performance indicators

All the following figures and results come from the analysis of the sample of 8 municipalities<sup>1</sup>:

**Average indicator values classified by management models<sup>2</sup>**

|  | Municipal | EICE | Mixed | Private |
|--|-----------|------|-------|---------|
| <b>Number of house connections</b>                     | 1689      | 4614 | 16149 | 4674    |
| <b>Access to safe water (%)</b>                        | 96        | 100  | 100   | 97      |
| <b>Access to sewerage system (%)</b>                   | 97        | 100  | 88    | 87      |
| <b>Unaccounted for Water (%)</b>                       | 56        | 29   | 28    | 44      |
| <b>Service continuity (%)</b>                          | 93        | 100  | 100   | 99      |
| <b>Water price in US\$ / m<sup>3</sup> for layer 2</b> | 0,14      | 0,18 | 0,24  | 0,18    |
| <b>Water price in US\$ / m<sup>3</sup> for layer 4</b> | 0,20      | 0,29 | 0,43  | 0,25    |
| <b>Tariff shift between layer 2 and 4 (%)</b>          | 29        | 37   | 44    | 29      |
| <b>Labour efficiency in US\$ / m<sup>3</sup></b>       | 0,12      | 0,07 | 0,07  | 0,07    |
| <b>Number of employees for 1000 HC</b>                 | 8         | 6    | 3     | 2,67    |
| <b>Invoices recovery rate (%)</b>                      | 94        | 95   | 98    | 97      |
| <b>O&amp;M expenditures / sale turnover (%)</b>        | 59        | 102  | 65    | 83      |

### 3.2. Connection fees

The connection fees for W&S services can have two different parts:

- (i) The recovery of the capital costs for the connection;
- (ii) A fee for the right to access services.

Considering the ten municipalities sample, and taking as a reference the connection fees for layer 4, one can observe that there is no connection fee when the service is directly managed by the municipality (but all the new clients are not connected); in the case of a private operator the average fee is US\$ 98 (this does not include the recovery of capital costs for connection, which is supposed to be covered by Acuan-tioquia); in La Ceja (EICE model) the connection fees are the highest observed (US\$ 205), and in this case there is full recovery of capital costs.

## 4. Financial viability of the services

### 4.1. A complicated tariffs structure and a cross-subsidy system that doesn't work

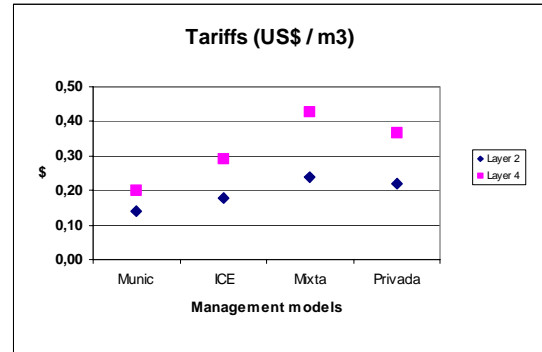
In Colombia the tariffs structure is very complicated – a fixed charge and a progressive charge by cubic meter (with 3 different levels). The tariff to be paid by the client also depends on a 6-layer classification based upon the socio-economic level of the client. Tariffs are theoretically designed to allow layers 5 and 6 (corresponding to the richest people) to subsidize layers 1, 2 and 3 (the poorest and middle-class people). The deficit of this cross-subsidy system is supposed to be paid by the municipality, using a “Solidarity fund” paid for directly from the municipal budget.

<sup>1</sup> For further details see the table in part 6.

<sup>2</sup> This can be justified by the specific cases of Turbo and Apartado, two towns where some recent districts were illegally connected to the service, situation which is progressively regularizing. A more in-depth analyze will be carried out in the continuation of the study.

In Antioquia (without Medellín and its neighborhoods), the layers distribution is as shown in the table:

| Layers       | Number of houses | %             |
|--------------|------------------|---------------|
| 1            | 41.345           | 17.2%         |
| 2            | 91.169           | 37.8%         |
| 3            | 101.144          | 42.0%         |
| 4            | 6.791            | 2.8%          |
| 5            | 428              | 0.2%          |
| 6            | 79               | 0.0%          |
| <b>TOTAL</b> | <b>240.956</b>   | <b>100.0%</b> |



It seems very clear that layers 5 and 6 represent less than 0,3% of the total population, especially in the small towns, which makes it impossible for any kind of subsidy between layers. And the municipalities, because of their financial situation, are not able to create the Solidarity Funds needed to make up the deficit when subsidizing the poorest layers.

Taking layer 4 as an approximation of what should be a tariff allowing full-cost recovery, and considering the price for a monthly consumption of less than 20 m<sup>3</sup>, one can observe that the tariff goes from US\$ 0,20 to US\$ 0,43 for water and sanitation services (see graph above). Layer 2 being predominant in the sample of 10 municipalities that has been examined, we can conclude that the difference between “normal” and “current” tariffs is 20% to 44%.

According to Law # 142, municipalities should have reached tariffs representing full cost (including depreciation and savings for renewal) recovery by 2001, including the maximum levels for subsidizing the poorest layers (respectively 50%, 40% and 15% for layers 1, 2 and 3). But municipalities have experienced such problems in reaching these objectives that the time-frame has been pushed back to 2005.

#### 4.2. Investments, renewal and extension financing

According to Law # 142 of 1994, the municipalities – or Acuantioquia for 32 of the 125 municipalities in the Department of Antioquia – are owners of the systems and they have to renew and extend them.

In most of the studied municipalities, the sale turnover of W&S services are used to cover O&M costs and administrative costs. This point can easily be highlighted by using the “Labour efficiency” indicator, expressed as the ratio between administrative and O&M expenditures and the total sale turnover. The value of this indicator varies from 59% in the case of a municipal management up to 102% for the EICE.

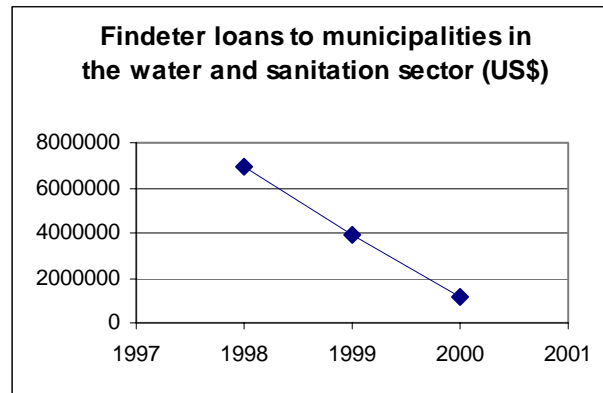
The two main financing agencies for the W&S sector in the Department of Antioquia are IDEA (*Instituto para el Desarrollo de Antioquia*, Development Institute of Antioquia) – and FINDETER – *Financiera de Desarrollo Territorial* – Financing Agency for Territorial Development), and other agencies such as CORNARE (an institute for the promotion of environmental projects), which can finance the construction of wastewater treatment plants.

But FINDETER loans to the municipality in the water and sanitation sector have been rapidly decreasing over several years, as shown in the following chart. This does not reflect a political decision, but is due to the incapacity of municipalities to take on new loans, taking into account their level of debt.

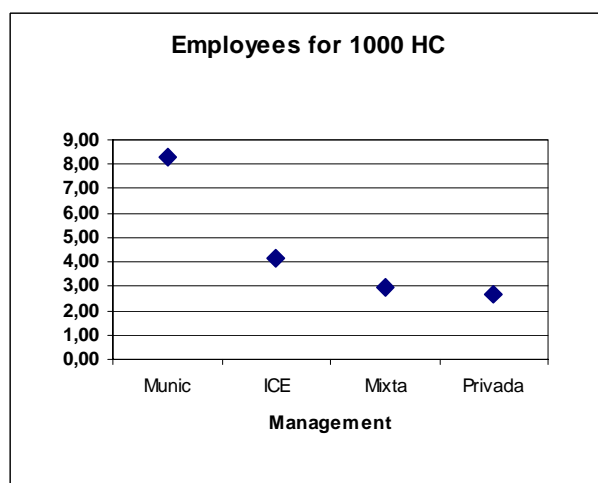
#### Good practices in financing investments

A first example of good practice is the case of Marinilla (see above § 2.4), where the municipality and the private operator have jointly elaborated an investment plan for the next 10 years, with technical advice from the private operator in the design and the supervision of works.

A second example is the co-financing of CORNARE (promoting environmental projects), whose non-refundable contribution allowed three municipalities (Marinilla, La Ceja and Rionegro) to construct wastewater treatment plants (providing US\$ 950,000 in the case of Marinilla, towards an estimated total investment – W&S – of US\$ 2,000,000).



#### 4.3. Commercial and financial aspects - Profitability of W&S services private providers



Number of employees for 1000 HC is a management model sensitive indicator. The lowest level is 2,7 for the private operators. In comparison, when the municipality directly operates the service, it represents an average of 8,3 employees for 1000 HC, 3 times more than private operators. This can partially be explained by political interference from the municipality in the management and in the recruiting process. The level of this indicator is quite comparable for the three models: EICE, Mixed and Private – which seems to indicate that the autonomy of the utility is a determining factor.

The labor efficiency, which represents the staff cost per invoiced cubic meter varies from US\$ 0,07 for EICE, private and mixed companies up to US\$ 0,12 per m<sup>3</sup> in the case of a direct municipal management.

#### Some financial indicators for 4 private operators – Year 2000 – Thousands of US\$

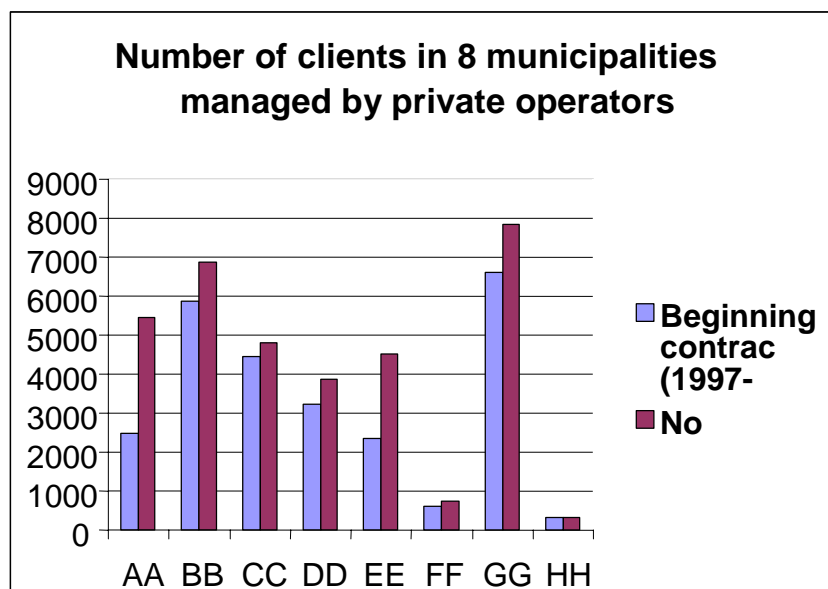
|   | A   | B     | C     | D     | MIXED  |
|---|-----|-------|-------|-------|--------|
| <b>Sales turnover</b>                           | 335 | 1.244 | 1.555 | 1.718 | 1.916  |
| <b>Net benefit</b>                              | 116 | 38    | 368   | 106   | 492    |
| <b>Total assets</b>                             | 465 | 608   | 1.168 | 240   | 11.616 |
| <b>Inheritance</b>                              | 203 | 428   | 538   | 145   | 9.388  |
| <b>Liquidities</b>                              | 1.8 | 1.7   | 1.6   | 2.0   | 1.9    |
| <b>Debt level (%)</b>                           | 56  | 30    | 54    | 40    | 19     |
| <b>O&amp;M expenditures / sale turnover (%)</b> | 62  | 93    | 80    | 93    | 66     |

In all cases, private operator management has induced a strong increase in coverage rate and cost recovery (as can be seen in the following table and in the following chart).

In the case of the operator managing 7 small towns, the average increase in the number of clients was 10% per year, whereas the demographic growth rate is around 3%.

Some management indicators – Average annual growth rates (%) – December 2000

| MUNICIPALITY | BEGINNING      | CLIENTS % | RECOVERY % | POPULATION % |
|--------------|----------------|-----------|------------|--------------|
| AA           | January 1997   | 21.7      | 26.0       | 3.38         |
| BB           | March 1997     | 4.3       | 7.5        | 3.13         |
| CC           | June 1997      | 2.2       | 6.7        | 0.70         |
| DD           | September 1997 | 5.8       | 7.2        | 2.67         |
| EE           | October 1997   | 24.3      | 43.0       | 9.06         |
| FF           | November 1997  | 5.4       | 3.9        | 4.98         |
| GG           | December 1997  | 5.7       | 2.3        | 3.72         |



Considering data about the profitability of private operators, it appears that management contracts are quite interesting, and private operators can invest in scheme upgrades. The reliability of data concerning this point will need to be improved as the case study continues.

| CONCEPTO/OPERADOR                   | A  | B    | C   | D  | MIXTA |
|-------------------------------------|----|------|-----|----|-------|
| Rentabilidad Patrimonial (%)        | 82 | 10   | 106 | 31 | 5.6   |
| Tasa Descuento Máxima CRA(%)        | 14 | 14   | 14  | 14 | 14    |
| Excedente (faltante) – (%)          | 68 | (4)  | 92  | 17 | (8.4) |
| Excedente (faltante) – (Miles US\$) | 96 | (16) | 319 | 20 | (738) |

## 5. Conclusions and recommendations

### 5.1. During the last 4 years a new type of public-private-participation is emerging in the Department of Antioquia...

- A management model under which the municipality directly manages W&S services has clear limitations, but is still the prevailing model for small towns in Colombia.
- In Antioquia Department, private operators provide services to 145,000 clients, which represents 53% of the inhabitants of small towns in the Department. These operators have reached quite a good level of professionalism and the fact that they serve an average of 4 towns each introduces economies of scale that allow operators to reduce their operational costs.
- In the small towns where services are provided by private operators, one can observe a significant increase of basic service performance indicators, which leads to improved coverage (up to 100%) and meets users' demands in terms of service quality.
- In some cases, the very good relationship between the (private) operator and the municipality allows quite interesting improvements in contractual arrangements. For instance, when the private operator offers technical advice for designing works and supervising their execution.

### 5.2. ...but there remain some bottlenecks for service improvement

- Private operators only have a "delegated management contract", and they are not supposed to invest to improve coverage or to extend services.
- Transfers from the central State to the municipalities are decreasing each year, and most of the municipalities have exceeded their capacity to take loans; this means that municipalities can no longer invest.
- Cross-subsidies between clients do not work because more than 90% of clients belong to lower socio-economic layers that are supposed to be subsidized.
- Tariffs are high enough to cover O&M costs and remuneration of the private operator, but they are not sufficient to recover investment costs for renewal or scheme extension.
- Political interference is correlated with the level of private participation. A private operator appears to have much more autonomy in decisions than a public utility.

### 5.3. Some recommendations (steps forward)

- Small towns is a new field for which the legal framework must be amended to take small towns into account in a more specific way.
- One of the main criteria for the performance of the operator is the autonomy of the service provider. The municipal (direct) management model should be progressively given up.
- Tariff settlement rules should be improved and decentralized to the most local level possible.
- Promotion of new management rules that allow private operators to invest directly in the extension and renewal of systems, would represent a progressive evolution from a simple management contract to a leasing contract, including targets in terms of service coverage, etc.

## 6. Field data from the 10 municipalities sample

| MUNICIPALITY                          |                                     | HISPANIA    | SAN VICENTE   | AMAGÁ           | JARDÍN                 | MARINILLA          | TURBO              | APARTADÓ               | RIONEGRO      | SAN JERÓNIMO          | LA CEJA          |             |
|---------------------------------------|-------------------------------------|-------------|---------------|-----------------|------------------------|--------------------|--------------------|------------------------|---------------|-----------------------|------------------|-------------|
| MANAGEMENT MODEL                      |                                     | Municipal   |               |                 | Private Operator       |                    |                    | Mixed                  | EICE          |                       |                  |             |
| GENERALIDADES                         | Urban area surface (km2)            | 0,2         | 1,7           | 1,5             | 1,0                    | 2,9                | 11,9               | 6,7                    | 10,0          | 0,5                   | 4,5              |             |
|                                       | Altitude (m)                        | 1 000       | 2 150         | 1 400           | 1 750                  | 2 120              | 2                  | 25                     | 2 125         | 780                   | 2 200            |             |
|                                       | Average temperature (°C)            | 21          | 17            | 21              | 19                     | 17                 | 28                 | 28                     | 17            | 25                    | 16               |             |
|                                       | National census                     | 1985        | 2 362         | 3 998           | 10 044                 | 5 844              | 16 418             | 27 775                 | 31 308        | 30 835                | 2 279            | 21 047      |
|                                       |                                     | 1993        | 2 559         | 3 524           | 10 259                 | 6 462              | 21 011             | 36 233                 | 63 645        | 42 201                | 2 758            | 26 940      |
|                                       | Population growth rate 1985-1993    | 1,01        | -1,57         | 0,27            | 1,26                   | 3,13               | 3,38               | 9,27                   | 5,18          | 2,41                  | 3,13             |             |
|                                       | Estimated population in 2000        | 2 511       | 4 359         | 11 324          | 7 168                  | 22 794             | 43 908             | 75 522                 | 54 837        | 3 094                 | 32 097           |             |
|                                       | Main economical activities          | Agriculture | Agriculture   | Coal & breeding | Agriculture & breeding | Sale & agriculture | Sale & agriculture | Agriculture & breeding | Food industry | Agriculture & tourism | Flowers industry |             |
| Year of fundation of the municipality | 1 984                               | 1 814       | 1 812         | 1 882           | 1 787                  | 1 847              | 1 968              | 1 783                  | 1 757         | 1 814                 |                  |             |
| Urban layer 1, 2 y 3 (%)              | 100                                 | 100         | 99            | 96              | 100                    | 95                 | 94                 | 83                     | 79            | 93                    |                  |             |
| WATER AND SANITATION FACILITIES       | Who operates?                       |             | Municipio     | Municipio       | Municipio              | Ing. Total         | Conhydra           | Conhydra               | Presea        | A. de Rio.            | A. de S.J.       | EP de La C. |
|                                       | Treatment plant                     | State       | Good          | Good            | Good                   | Good               | Good               | Good                   | Good          | Good                  | Good             | Good        |
|                                       | Pumping station                     | State       | Doesn't exist | Doesn't exist   | Doesn't exist          | Doesn't exist      | Good               | Good                   | Good          | Good                  | Doesn't exist    | Good        |
|                                       | Water tank                          | State       | Good          | Good            | Good                   | Good               | Good               | Good                   | Good          | Good                  | Good             | Good        |
|                                       | Piped water network                 | State       | Good          | Bad             | Regular                | Good               | Regular            | Regular                | Regular       | Regular               | Regular          | Good        |
|                                       | Sewerage network                    | State       | Good          | Bad             | Regular                | Regular            | Regular            | Regular (1)            | Regular       | Regular               | Bad              | Good        |
| OPERATIONAL INDICATORS                | Number of house conexions (water)   | 938         | 1313          | 2815            | 2304                   | 7044               | 6218               | 7300                   | 16149         | 1214                  | 8014             |             |
|                                       | % of pop. with access to safe water | 72          | 100           | 100             | 90                     | 99,3               | 54                 | 49                     | 100*          | 100                   | 99,88            |             |
|                                       | % of pop. with access to sewerage   | 72          | 100           | 100             | 82                     | 89,4               | Municipio          | 32                     | 88*           | 100                   | 97,16            |             |
|                                       | Metering (%)                        | 100         | 97            | 95              | 97                     | 100                | 97                 | 40                     | 90            | 100                   | 99,75            |             |
|                                       | Water production (000 m3 / year)    | 326         | 429           | 1306            | 923                    | 1872               | 2988               | 6550                   | 4208          | 376                   | 2318             |             |
|                                       | Billed water (000 m3 / year)        | 195         | 219           | 488             | 369                    | 1152               | 1008               | 2574                   | 3030          | 236                   | 1669             |             |
|                                       | m3 per client and per month         | 17,3        | 14            | 15              | 13                     | 14                 | 15                 | 29                     | 16            | 16                    | 17               |             |
|                                       | Number of employees (W&S)           | 5           | 13            | 24              | 8                      | 17                 | 22                 | 35                     | 45            | 9                     | 29               |             |
|                                       | Unaccounted for Water - UFW (%)     | 40          | 49            | 62              | 59,6                   | 38,5               | 66                 | 61                     | 28,3          | 37                    | 28,05            |             |
|                                       | Service continuity (%)              | 93          | 97            | 91,7            | 98                     | 99                 | 74                 | 85                     | 100           | 100                   | 100              |             |
| Employees for 1000 HC                 | 5                                   | 10          | 8,5           | 3,9             | 2,5                    | 3,9                | 4,5                | 2,9                    | 8             | 4                     |                  |             |
| COMERCIAL AND FINANCIAL DATA          | Total billed amount (000 US\$)      | 32          | 55            | 144             | 180                    | 422                | 340                | 795                    | 1916          | 49                    | 847              |             |
|                                       | O&M costs & depreciation (000 US\$) | 34          | 43            | 99              | 135                    | 358                | 410                | 670                    | 1256          | 53                    | 852              |             |
|                                       | Savings for renewal (000 US\$)      | 23          | 31            | 56              | 39                     | 61                 | 73                 | 170                    | 201           | 28                    | 106              |             |
|                                       | Average W&S tariff US\$ / m3        | 0,17        | 0,25          | 0,29            | 0,49                   | 0,37               | 0,34               | 0,31                   | 0,63          | 0,21                  | 0,51             |             |
|                                       | Work efficiency (US\$ / m3)         | 0,12        | 0,14          | 0,12            | 0,13                   | 0,05               | 0,07               | 0,07                   | 0,07          | 0,12                  | 0,06             |             |
|                                       | Indice de Recauda. (%)              | 80          | 98            | 96              | 97                     | 97                 | 72                 | 95                     | 98            | 87                    | 96               |             |
|                                       | O&M expenditure / receipts          | 106         | 78            | 69              | 75                     | 85                 | 120                | 84                     | 66            | 109                   | 101              |             |

(1) Operated by the municipality