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Water Distribution System of Santa Marta city, Colombia

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Abstract

Santa Marta is a city on the Caribbean coast of Colombia, the water distribution system is operated by Metroagua S.A and has 91,4% coverage represented by 95,420 users. The natural sources of water supply are Piedras, Manzanares and Gaira Rivers and the aquifer of Santa Marta, water is transported to the two water treatment plants: Mamatoco and El Roble. It has a Non-revenue water index of 46.8% mainly due fraudulent connections. On the other hand, the water distribution network is divided into two major subsystems: Subsystem North formed by 19 sectors and Subsystem South with 6. The main problem of the city is the water shortage due the severe drought, which has led to propose solutions to short, medium and long terms.

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1. Description of the City

Santa Marta is a city located over the Caribbean coast, northern of Colombia. Officially Tourist District, Cultural and Historical it is the capital of the department of Magdalena, is seated between the coast and Sierra Nevada de Santa Marta foothills, a peripheral mountainous massif and mean hydric source in the region for its top glaciers and moors. Is the oldest city existing in Colombia and the second oldest in South America. This city is bordered to the north and west by the Caribbean Sea, south with the municipalities of Ciénaga and Aracataca and east with the department of La Guajira through the Palomino river. The topography of the city is relatively flat, with surrounding. The city is

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crossed by Manzanares and Gaira Rivers that begin in the mountainous massif mentioned before [1]. The city has an important coastal aquifer recharge by Manzanares and Gaira Rivers and the Tamacá brook [2]. It presents a tropical climate as well, with average annual temperatures of 23 °C to 32 °C [1]. Its average precipitation does not exceed 362 mm of rain per year. Its main economic activities are commerce and tourism; among the tourist sites are emblematic Rodadero, Taganga, Tayrona National Natural Park, Minca and Ciudad Perdida.

Nowadays, it has an estimated population of 500 thousand inhabitants in constant growth, this excluding floating population[2].

2. Description of supplied population

Nowadays, Santa Marta's water distribution system is operated by METROAGUA S.A. E.S.P. and has a coverage of 91,4% represented by 95420 users. The Table 1 classifies the users of the city [3].

Table 1. Type of Users connected to the water distribution system of Santa Marta

Type of Users	Number of Users	Coverage
Residential	89,886	94.20%
Commercial	5,429	5.69%
Industrial	105	0.11%
Total	95,420	100%

As it could be seen in Fig. 1, commercial users are concentrated mostly in two specific zones inside the city, Centro Histórico (ancient city downtown) and the touristic neighborhood known as "El Rodadero", besides, they concentrate along main avenues. Industrial users are located heterogeneously distributed, while residential users surround the Centro Histórico, representing most of the population users. In the present, serviced population represents a total flow demand of 1220 L/s in the source, estimated as average daily flow, with a per-capita endowment of 150 Liters per habitant per day [3].

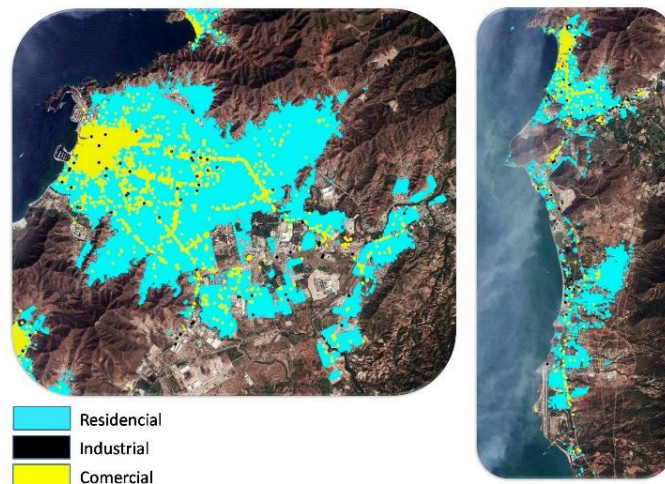


Fig. 1. Spatial distribution of the types of users of Santa Marta

3. Description of the Water Distribution System

3.1. Supplying Sources

Supplying systems of the city's water distribution system are Manzanares, Piedras and Gaira rivers and the Santa Marta aquifer. In the case of the mentioned rivers, they are born in Sierra Nevada de Santa Marta (Santa Marta snowy massif), specifically on the San Lorenzo basin to an approximate height of 2600 meters above sea level and flows into

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