The panorama of water quality in small municipalities in the Zona da Mata region of Minas Gerais: technical-operational criteria

Nunes T.V.* Castro J.S.* Costa T.R.** Gonçalves I.S.*** Morais A.A.****
*Sanitary Engineer at the Intermunicipal Basic Sanitation Consortium of the Zona da Mata of Minas Gerais (CISAB-ZM), Viçosa MG, Brazil
**Technical Operational Director at the Intermunicipal Regulatory Agency for Sanitation Services of Minas Gerais (ARIS-MG), Viçosa MG, Brazil
***Superintendent of the Intermunicipal Basic Sanitation Consortium of the Zona da Mata of Minas Gerais (CISAB-ZM), Viçosa MG, Brazil
****Professor at the Federal University of Itajubá (UNIFEI) - Itabira Campus, Itabira MG, Brazil

Highlights:

- Small municipalities are more vulnerable when it comes to the distribution of potable water;
- Elementary obstacles still persist in public water supply systems;
- The absence of a qualified technical team directly affects the quality of water distributed by municipalities.

Keywords: Efficiency; sanitation law; ordinance

INTRODUCTION

Since the promulgation of Law No. 11,445 in 2007, recently updated by Law No. 14,026 in 2020, Brazil has been institutionalized to seek solutions towards the universalization of basic sanitation. The access to potable water, established in 2010 by the United Nations (UN) (Resolution A/RES/64/292) as a human right and regulated in Brazil by Ordinance GM/MS No. 888 of 2021, remains violated due to deficiencies in Brazilian public services.

The New Sanitation Framework (Law No. 14,026 of 2020) provides for the guarantee of 99% of the population being served with potable water by December 31, 2033, in addition to the improvement of treatment processes. Despite the mandatory nature, many municipalities, especially small ones, still face basic infrastructure obstacles, lack of financial, human, and material resources, reflecting the reality of water distribution that does not meet minimum potability requirements and is far from universal coverage.

For this reason, we sought to elucidate the state of water quality in small municipalities in the Zona da Mata of Minas Gerais, based on technical and operational criteria considered fundamental to the quality of service delivery to the population, which can be addressed with the technical support of intermunicipal consortia.

METHODOLOGY

Sixteen Water Treatment Stations (WTS) from the headquarters of 11 small municipalities (PNAS2024) in the Zona da Mata of Minas Gerais, members of the Intermunicipal Basic Sanitation Consortium of

the Zona da Mata of Minas Gerais (CISAB-ZM) and regulated by the Intermunicipal Regulatory Agency for Sanitation Services of Minas Gerais (ARIS-MG), were analyzed. Municipalities were considered based on the 2nd cycle of inspections, using the years 2022 and 2023 as a reference, depicting the most recent reality of the service providers concerning planning and management stages, financial resources, physical infrastructure, and qualified technical staff.

Six technical-operational criteria were listed from Inspection Reports published by ARIS-MG, considered essential to ensure water potability and service quality, whose failures could compromise user quality and health (Figure 1).

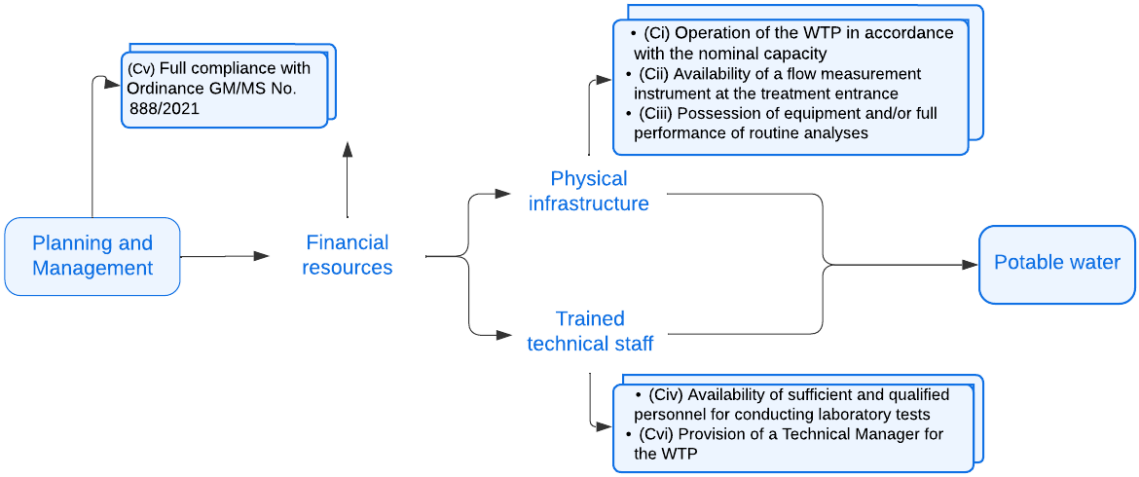

Figura 1. Framing of the analyzed criteria in the stages that make up the distribution of potable water.

RESULTS AND CONCLUSIONS

From the obtained data, it was observed that 50% of the WTSs operate with a flow rate exceeding the nominal capacity. Moreover, 5 out of 13 systems equipped with flow measurement instruments at the treatment entrance have them in poor physical condition, generating questionable results. Operating beyond the designed limit and the lack of control over the received volume can overload the units, increasing costs with inputs and maintenance, as well as compromising the overall water treatment process.

It is noted that only 56.25% of the WTSs have adequate equipment and/or perform all routine analyses required by Ordinance GM/MS No. 888/2021. However, even when partially conducted, they may not result in reliable outcomes, as 5 out of the 16 do not have qualified and sufficient personnel to perform laboratory procedures. The deficiency in these criteria hinders the translation of obtained results into immediate maneuvers in the system to achieve the expected outcomes at each stage and at the end of the process.

Regarding potability, it is observed that 100% of the analyzed WTSs do not fully carry out the sampling plans defined by the reference ordinance. Paradoxically, 14 out of the 16 WTSs have a Technical Responsible who is legally accountable for the procedures and water quality offered, although the

systems do not present the minimum conditions of operation and quality to ensure this service (Figure 2).

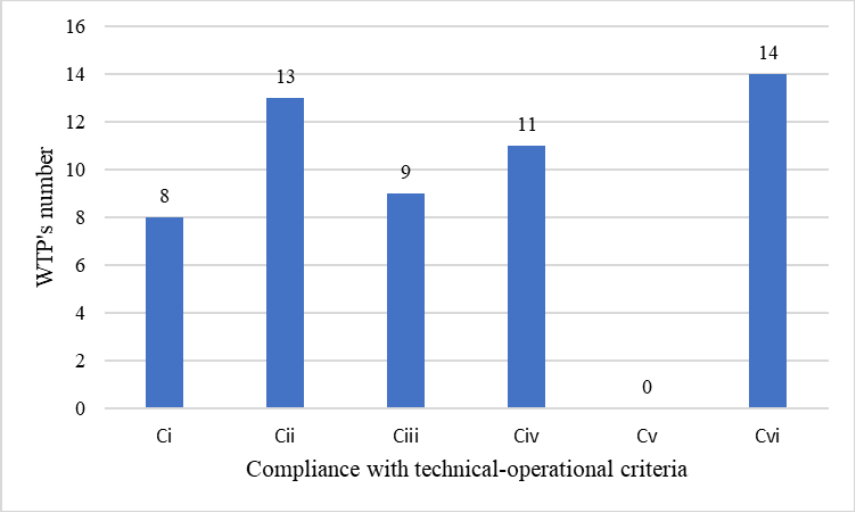

Figura 2. Number of WTSs meeting the analyzed criteria.

The study shows that municipalities face fundamental failures and obstacles in the face of existing technologies and innovations in the market, remaining quite vulnerable in the processes and routine operations adopted, compromising the efficiency of the water treatment to be distributed. It is assumed that this is the profile of a large part of the small municipalities (50) associated with CISAB-ZM, based on the recurrence of the challenges faced, which highlights the slow process towards universalization and reinforces the limitations of service providers against political forces, financial deficits, and the availability of human and material resources.

Considering the adopted criteria, it is evident that none achieved the expected satisfactory results. However, CISAB-ZM stood out in supporting municipalities in 5 out of the 6 criteria by preparing projects for system expansion, conducting shared procurement processes for equipment, inputs, materials, and services, providing operator training, and mainly enabling the conduct of laboratory analyses at the Environmental Sanitation Reference Center - CISAB LAB at an affordable cost and with agility in solving non-conformities observed in the results.

Investing in potable water not only results in better health conditions for the population by reducing vulnerability to waterborne diseases but also promotes dignity and quality of life. In this context, intermunicipal consortia like CISAB-ZM represent an efficient collaborative solution. The possibility of carrying out sanitation demands with economies of scale, amortizing fixed costs and investments over a larger user base, reducing the unit cost of service production and distribution, is the path that municipalities can adopt to meet the requirements towards universalization on the scale that legislation envisions (Piterman Rezende and Heller 2016). Such an approach not only benefits municipalities individually but also contributes to improving the quality of life and sustainable development of the region as a whole, with solutions that can be replicated in other Brazilian municipalities with similar profiles.

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