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Temporal Dynamics in Sanitation Coverage: A Longitudinal Study of SNIS data for Paraná and Mato Grosso do Sul (2008-2021)

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Highlights:

- **Analyzed sanitation data from Paraná and Mato Grosso do Sul (2008-2021) to determine coverage levels for sewage collection and water supply.**
- **Used SNIS data, Python for statistical analysis, and presented findings via texts, tables, and graphs.**
- **Found water supply coverage generally higher than sewage collection, with some municipalities at 100% and others at 0%.**
- **Noted data inconsistencies and overall increase in service coverage, but persistent inequalities among municipalities.**

Keywords: Sanitation data;Sewage collection;Water supply.

INTRODUCTION

The National Information System on Sanitation (SNIS) has gathered sanitation data from municipalities and service providers since 1996. This study analyzes the maximum, minimum, average, median, and mode levels of coverage for sewage collection and water supply in Paraná and Mato Grosso do Sul municipalities from 2008 to 2021. Examining over a decade of data provides insights into the realities and evolution of sanitation services, valuable for decision-makers, researchers, and the general public (OLIVEIRA, 2016).

METHODOLOGY

This is a quantitative, applied, ex-post facto study with a descriptive and longitudinal approach. Inspired by Libault's (1971) four-level structure, the study involves:

- **Compilation: Data from the SNIS (secondary source) is collected. The analysis unit is the municipality, covering 2008-2021, focusing on sanitary sewage collection and water supply coverage. Data is obtained from the SNIS website in CSV format.**
- **Correlation: A Python routine performs statistical calculations, including maximum and minimum levels and time series analyses, highlighting main positive and negative balances and amplitudes.**
- **Semantic: Results are presented through texts, tables, and graphs.**
- **Normative: The results are reflected upon and related to the research questions.**

RESULTS AND CONCLUSIONS

The analysis revealed a significant expansion in service coverage over the period, with water supply coverage generally higher than sewage collection. Several municipalities achieved 100% coverage in water supply, while others reached similar levels in sewage collection. Despite overall improvements, inequalities persist among municipalities.

Specific Findings:

- **Average sewage collection coverage improved from 41.73% in 2008 to 57.74% in 2021.**
- **Average water supply coverage increased from 74.57% in 2008 to 86.76% in 2021.**
- **Positive balances in water coverage were more consistent, with increases in Pinhais, Costa Rica, and Porto Barreiro.**
- **Significant positive balances in sewage collection were seen in Paraíso do Norte, Nova Londrina, and Presidente Castelo Branco.**
- **Negative balances in water coverage occurred in Paraíso das Águas, Terra Rica, and Marumbá. Ribeirão Claro stood out for sewage collection, though other negative balances were inconsistent.**
- **Disparities in average coverage levels were evident. Municipalities like Maringá and Cambará had high sewage collection coverage, nearing 100%, while Londrina had high water supply coverage. Conversely, Cerro Azul and São Joaquim do Triunfo had low averages in sewage collection and water supply, respectively.**

These findings highlight overall improvements in sanitation coverage, while indicating persistent anomalies and disparities. Comprehensive and accurate data is essential for informed decision-making, aiding policymakers and providing the general population with insights into sanitation coverage progress and challenges. This study offers detailed longitudinal data, shedding light on specific dynamics and changes in sanitation services over time.

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REFERENCES

Libault, A. (1971). Os quatro níveis da pesquisa geográfica. Métodos em Questão, 1, 1-14. Instituto de Geografia (USP).

Oliveira, M. L. (2016). Impacto das políticas públicas de saneamento no Brasil: Um estudo longitudinal. Fundação Getulio Vargas (FGV). https://repositorio.fgv.br/server/api/core/bitstreams/618e8737-4ce7-4a3b-9e57-e7a463271309/content

FIGURE