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CATCHING UP ON BASIC UTILITIES: DRINKING WATER, SEWERAGE AND NATURAL GAS NETWORKS IN ROMANIAN COMMUNES, 2010-2025

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Abstract: *The paper examines whether Romanian communes caught up in basic utility networks between 2010 and 2025 and which communes gained networks first. Locality data from INS for 2,861 communes show that the share with drinking water networks rose from 67.6% to 84.7%, with sewerage from 17.1% to 48.2% and with natural gas from 21.6% to 26.2%. Inequality of network length per inhabitant fell for all three networks, least for gas. Among communes without a network in 2010, larger and denser communes were more likely to obtain sewerage and gas, and sewerage followed existing water networks. Communes that lost population were less likely to obtain sewerage, but this association is less robust.*

Key words: *rural infrastructure, communes, convergence, sewerage, Romania*

• Introduction

Water, sewerage and gas networks are basic conditions for public health, housing and economic activity in rural areas, including agritourism. In 2010 only 17.1% of communes had sewerage and 21.6% gas. Network costs per user fall with size and density, while depopulation raises them.

Aim: to measure the catch-up of communes, 2010-2025, and identify which communes gained networks. Hypotheses:

- **H1** Inequality between communes **decreased** (σ-convergence)
- **H2** **Larger and denser** communes were more likely to gain a network
- **H3** **Depopulating** communes were less likely to gain a network
- **H4** Sewerage **followed** existing water networks

• Material and method

Locality data from INS TEMPO-Online (GOS106B, GOS110A, GOS116A, POP107D, LOC101B, AGR101B) for the **2,861 communes** existing in both 2010 and 2025. Gain models use communes without the network in 2010, with county fixed effects.

DATA
Network length (km), population, dwellings, area
2,861 communes

→

INDICATORS
Presence of network
km per 1,000 inhabitants
Gini and Theil indices

→

MODELS
Gain = β_1Pop + β_2Density + β_3ΔPop + β_4Water + county FE

→

ROBUSTNESS
Logit, hazard model
Region FE, excl. Ilfov
Leave-one-county-out

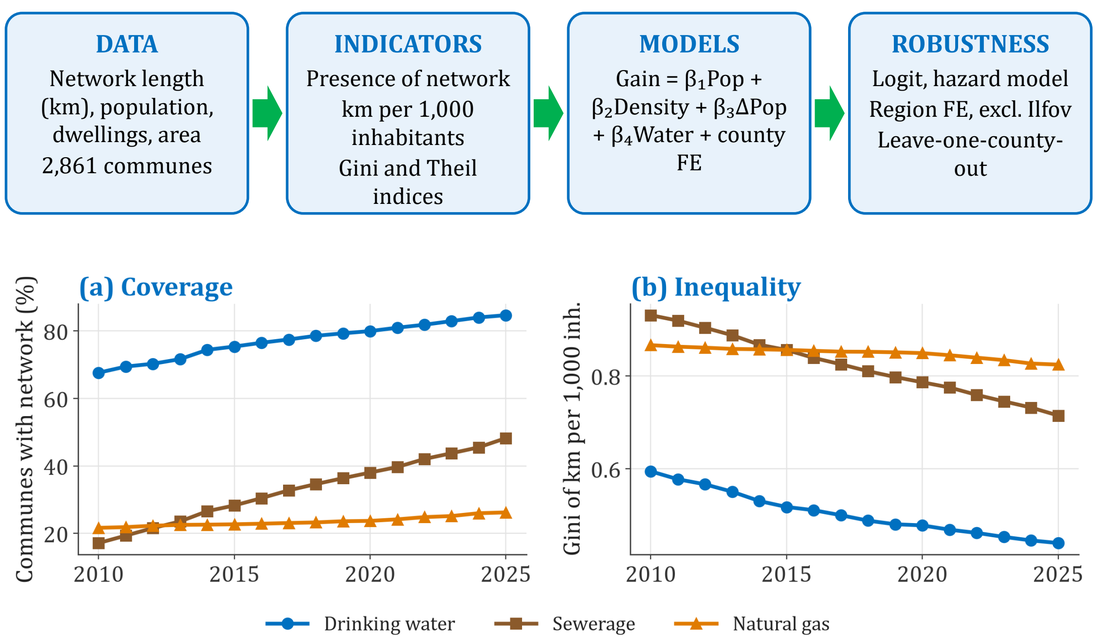


Figure 1. *Share of communes with each network (a) and Gini index of network length per 1,000 inhabitants (b)*

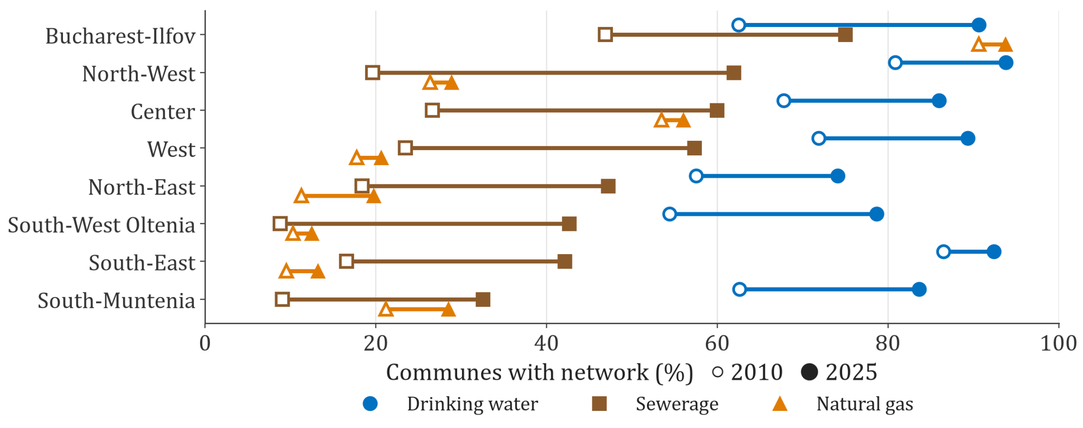


Figure 2. *Share of communes with each network by development region, 2010 and 2025*

• Results and discussions

84.7% communes with drinking water in 2025 (67.6% in 2010)

48.2% with sewerage: almost tripled from 17.1%

26.2% with natural gas: only +4.6 points since 2010

H1 supported. The Gini of km per inhabitant fell from 0.59 to 0.44 (water), 0.93 to 0.71 (sewerage) and only 0.87 to 0.82 (gas) (Fig. 1). All regions improved, but their ranking changed little (Fig. 2).

H2 supported for sewerage and gas. +1 SD of population meant +8.4 points in the probability of gaining sewerage, +1 SD of density +6.3 points; gas reached 16.0% of the largest vs 1.6% of the smallest communes (Fig. 3a).

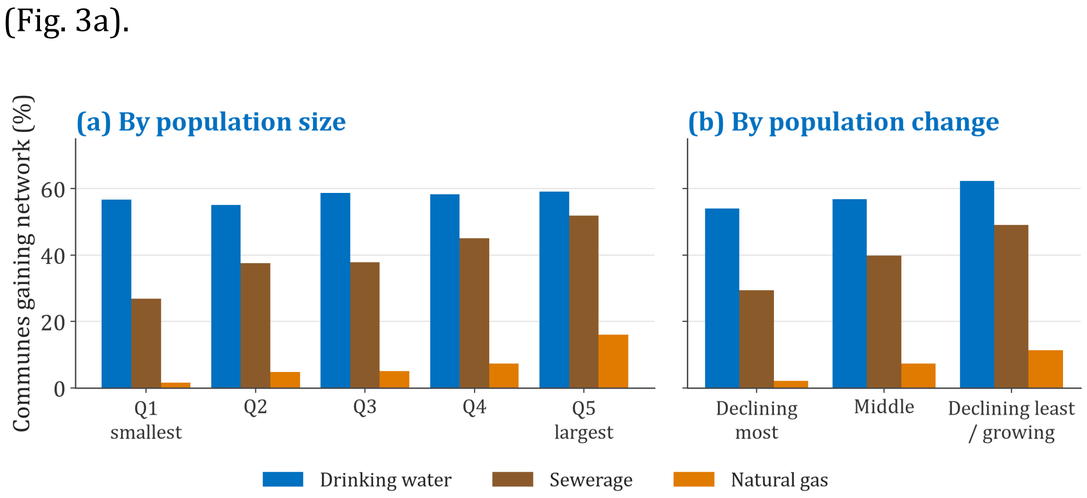


Figure 3. *Communes without a network in 2010 that had one in 2025, by population size (a) and population change 2010-2015 (b)*

H3 partly supported: +10 points of population change meant +2.8 points for sewerage, not robust in all models (Fig. 3b). **H4 supported:** a water network added 10.6 points; communes with water but no sewerage fell from 50.9% to 37.2% (Fig. 4).

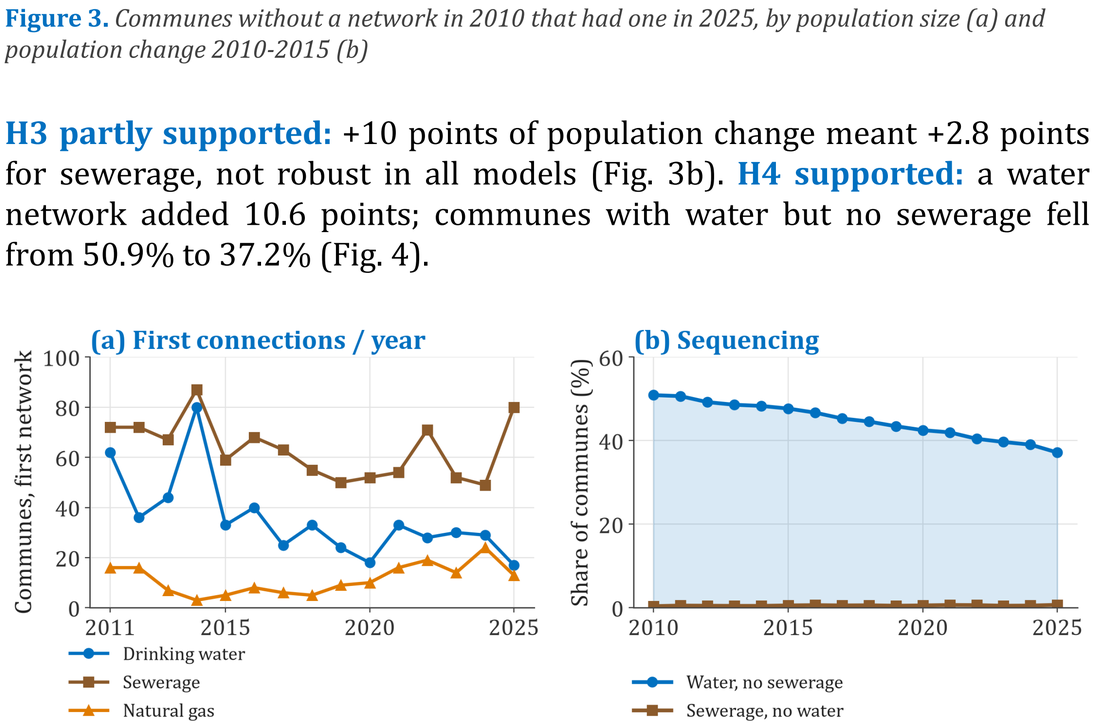


Figure 4. *Communes obtaining a first network, by year (a), and communes with only one of the two water networks (b)*

• Conclusions

- Communes caught up substantially: water reached 84.7% and sewerage almost **tripled** to 48.2%; gas expanded only marginally.
- Inequality between communes decreased for all networks, **least for gas**.
- New sewerage and gas went first to **larger, denser communes** that already had water.
- Future programmes need **coverage targets** for small and depopulating communes (e.g. decentralised wastewater solutions).