Assessing the contaminant reduction effects of the COVID-19 pandemic in China

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Introduction

- Background: The COVID-19 outbreak has severely damaged China's production activities, but significantly reduced the level of pollutant emissions.
- Research Gap: Existing studies mainly focus on a single pollutant and lack a comprehensive analysis of the impact of COVID-19 on the environment.
- Significance: A new comprehensive pollutant emission evaluation system was developed, and WHEM was applied for the first time to study the reduction effect of pollutants in various industries in China.

Objectives

- To assess the overall impact of COVID-19 on pollutant emissions.
- To provide theoretical and scientific basis for the formulation of environmental protection policies.

Highlights

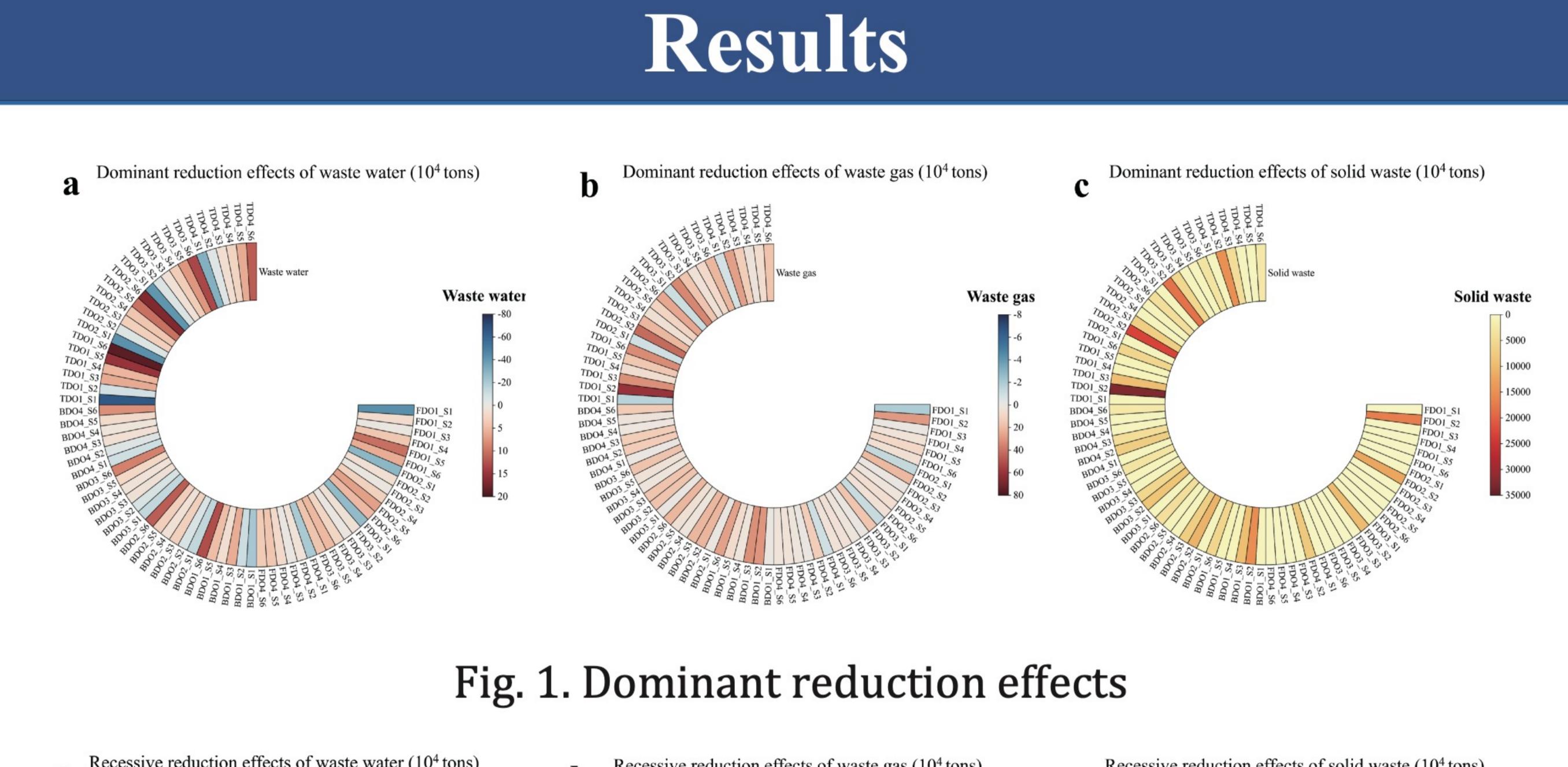
- Created a new comprehensive system for assessing contaminant emission changes.
- ❖ Quantified the unique linkage changes of contaminant emissions during COVID-19.
- ❖ Developed new models to reveal contaminants' regulatory difficulty and return.
- The innovative reduction effects of four key contaminant indicators were measured.
- Applied WHEM firstly in research across multiple areas of contaminant emissions.

Methods

- Used Weighted Hypothetical Extraction Method based on input-output analysis.
- Alleviated the deficiencies of HEM.
- Employed China's input-output table in 2020.
- Used the added value of GDP from 2016-2019 to calculate the weights.
- Nine major contaminants are included.

References

- Bao, R., Zhang, A.C., 2020. Does lockdown reduce air pollution?
 Evidence from 44 citiesin northern China. Sci. Total Environ. 731, 139052.
- Barouki, R., Kogevinas, M., Audouze, K., Belesova, K., Bergman, A., etc., 2021. The COVID-19 pandemic and globalenvironmental change: emerging research needs. Environ. Int. 146, 106272.



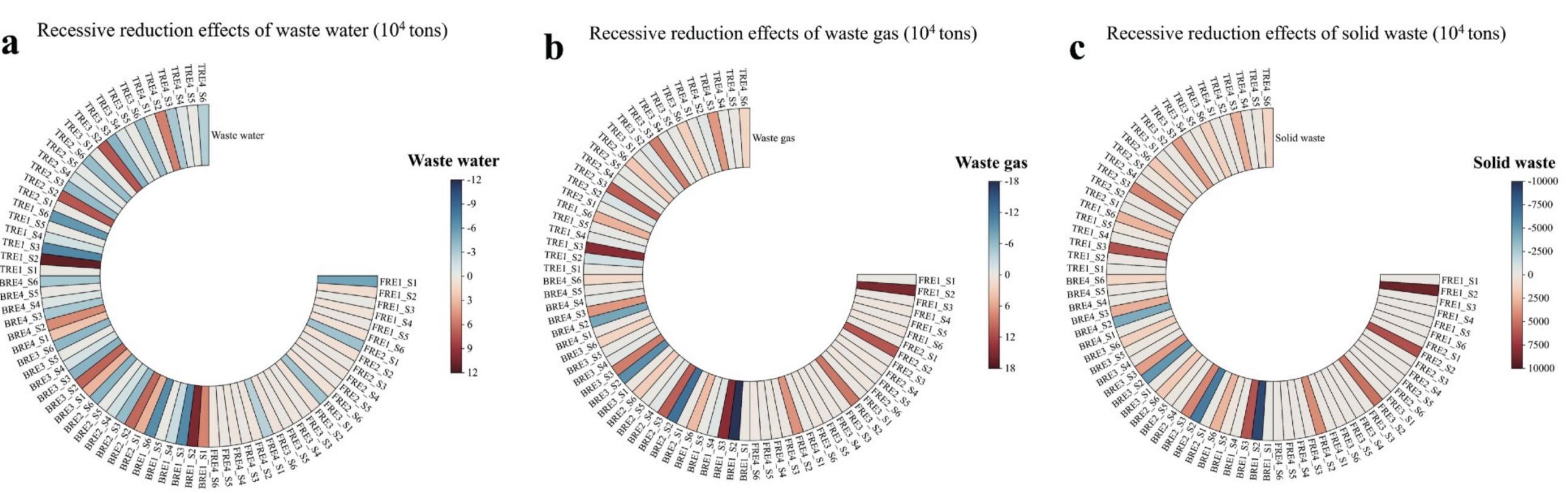


Fig. 2. Recessive reduction effects

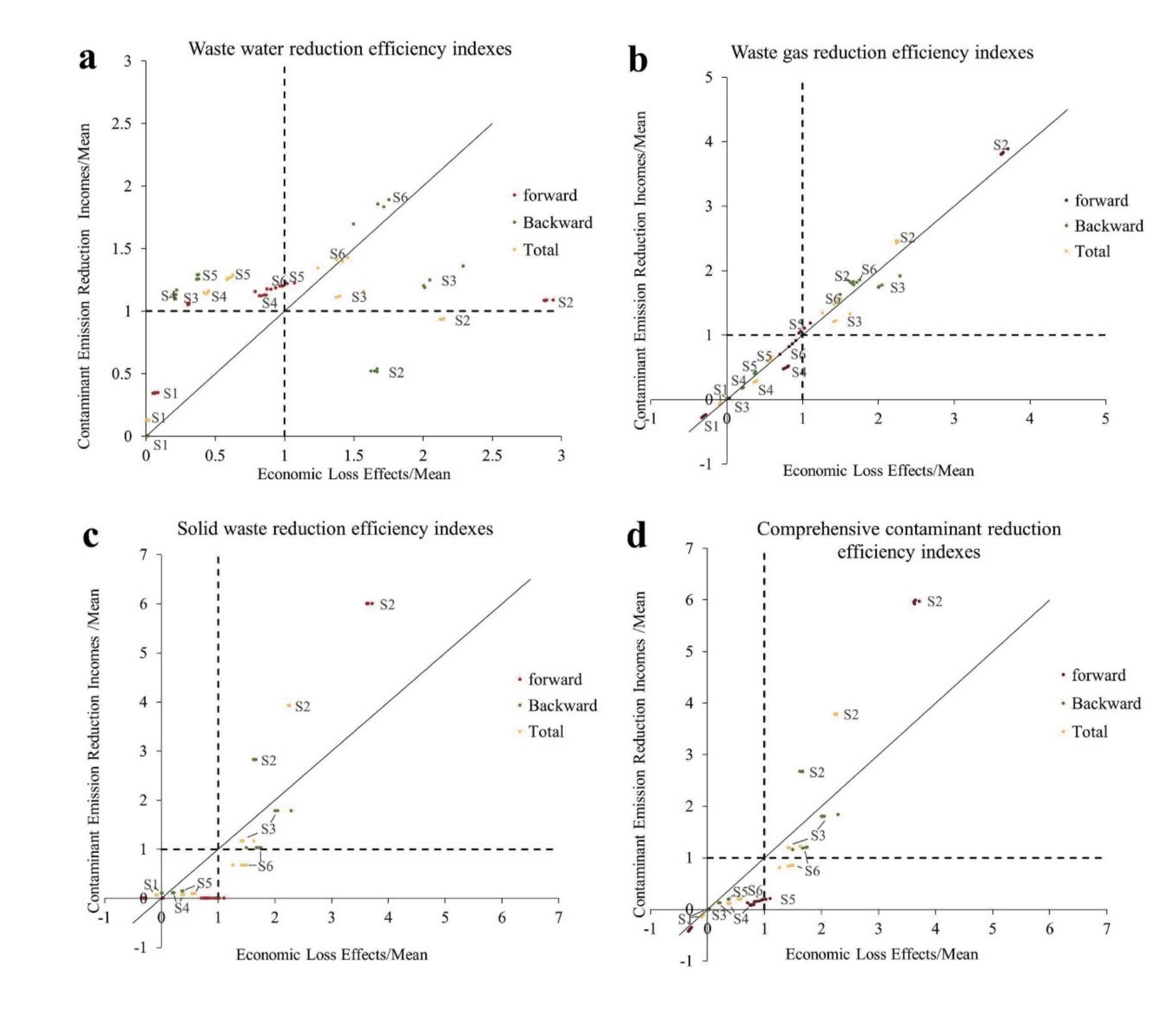


Fig. 3. Reduction efficiency

- Dominant reduction effects: Industry topped the list, followed by services, construction and agriculture.
- Recessive reduction effects: All contaminants in industry are difficult to regulate (forward). For backward linkages, construction is the hardest to regulate, while industry is the easiest.
- Reduction efficiency: The payoff for industry is relatively high.

Conclusions

COVID-19 initially reduced pollutant emissions in most sectors, but this effect faded over time. Timely measures are needed to consolidate emission reduction achievements, prevent a rebound in pollutant emissions, prioritize supervision of easily regulated industries, upgrade cleaner production in high-efficiency sectors.

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