

## Towards water-efficient food systems: assessing the impact of dietary change and food waste reduction on water footprint in Korea

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### Abstract

Globally, agriculture is one of the largest consumers and polluters of water resources, contributing to the unsustainable use of limited water resources. To reduce the resource use and environmental footprints associated with current and future food systems, researchers and policy makers have recommended the transition to sustainable and healthier diets and the reduction of food loss and waste along the food supply chain. However, there is limited information on the synergistic effects and trade-offs of adopting the two measures. In this study, we assessed the water-saving potential of the two measures in South Korea using environmentally extended input-output relying on the EXIOBASE database for the reference year 2020, along with scenario analysis to model the potential outcomes. Specifically, we analyzed scenarios where meat consumption was reduced by 30% and 50% and in combination with a 50% reduction in food waste at the consumption stage for each scenario. According to our findings, by considering individual measures of dietary change and food waste reduction, shifting to a diet with 30% and 50% less meat consumption could lead to reduction in water footprint by 6.9% and 7.5%, respectively, while 50% reduction in food waste at the consumption stage could save about 14% of water footprint. However, the synergistic effects of the two measures such as 30% less meat consumption and 50% food waste reduction, and 50% less meat consumption and 50% food waste reduction result to 20% and 24% reductions in water footprint, respectively. Moreover, our findings also showed that increasing food consumption with high environmental impacts could promote resources use inefficiency when waste occurs. Thus, policy strategies that address synergistic effects of both dietary change and food waste reduction should be strengthened to achieve sustainable food system. International and national policies can increase resource efficiency by utilizing all available reduction potentials while considering strategies interactions.

**Keywords :** Water footprint, Food waste, Sustainable consumption, Resource use efficiency.

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