

Evaluating the global wastewater's untapped irrigation potential

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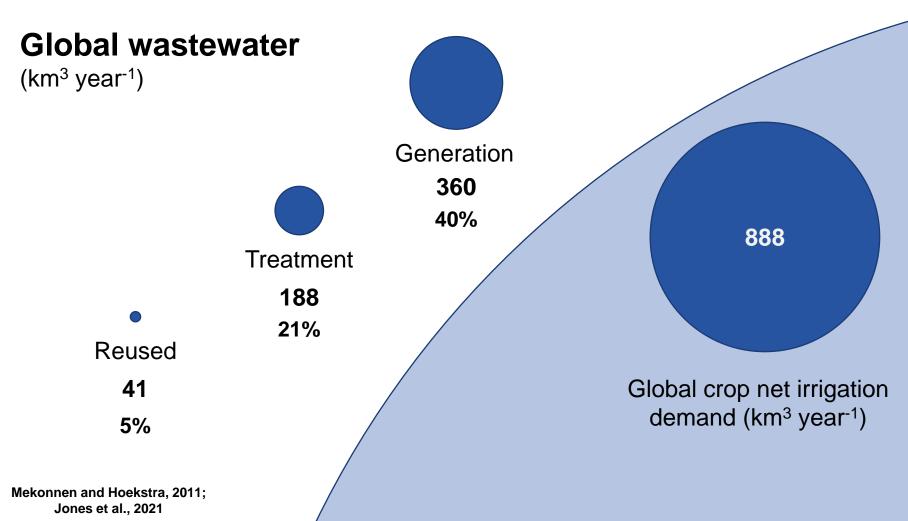
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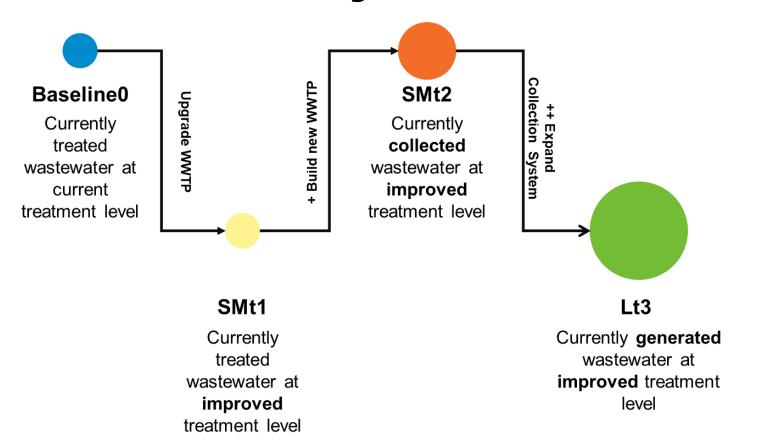
Wastewater irrigation untapped potential is *theoretically* high





Four technological scenarios

In this research we have estimated the **irrigation potential of reclaimed wastewater** at a global, regional, and national scale, under **four different technological scenarios**.



Data



Irrigation Available treated National division to Crop irrigation Crop production wastewater wastewater treatment (irrigated, all requirement requirements categories crops) Bruckner, et al. Macedo, et al. (2021) (2019)Jones, et al. (2021) IFPRI (2019) Available treated wastewater by treatment level List of crops with irrigation Irrigation req. maps restrictions (FAO) Wastewater availability Irrigation req. in service areas **Gravity model-based allocation procedure** Gravitational flow mask Discharge unallocated wastewater Maximal conveyance distance Total available wastewater (m³) Irrigation demand (m³) Allocated wastewater by crop (m³) Water scarcity maps Total conveyance distance (km) Discharged wastewater (m³) Gassert, et al. (2013)



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Available treated wastewater

Jones, et al. (2021)

National division to wastewater treatment categories

Macedo, et al. (2021)

Available treated wastewater by treatment level

Irrigated areas by WWTP II

WWTP II

Irrigated areas by WWTP II

Irrigated areas by both WWTPs

Gravity model-based allocation procedure

Discharge unallocated wastewater

Total available wastewater (m³)
Irrigation demand (m³)
Allocated wastewater by crop (m³)
Total conveyance distance (km)
Discharged wastewater (m³)

Gravitational flow mask

Irrigation req. in service areas

Maximal conveyance distance

Water scarcity maps

Gassert, et al. (2013)

Irrigation service areas



Available treated wastewater

Jones, et al. (2021)

National division to wastewater treatment categories

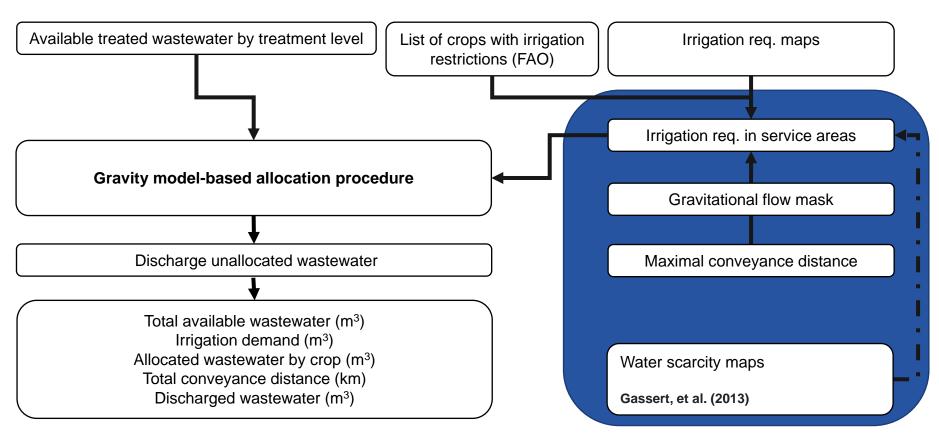
Macedo, et al. (2021)

Crop production (irrigated, all crops)

IFPRI (2019)

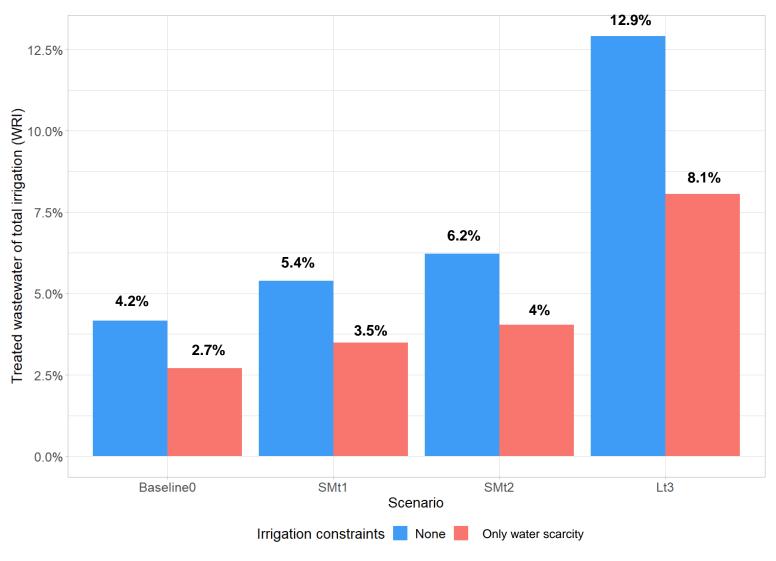
Crop irrigation requirement

Bruckner, et al. (2019)



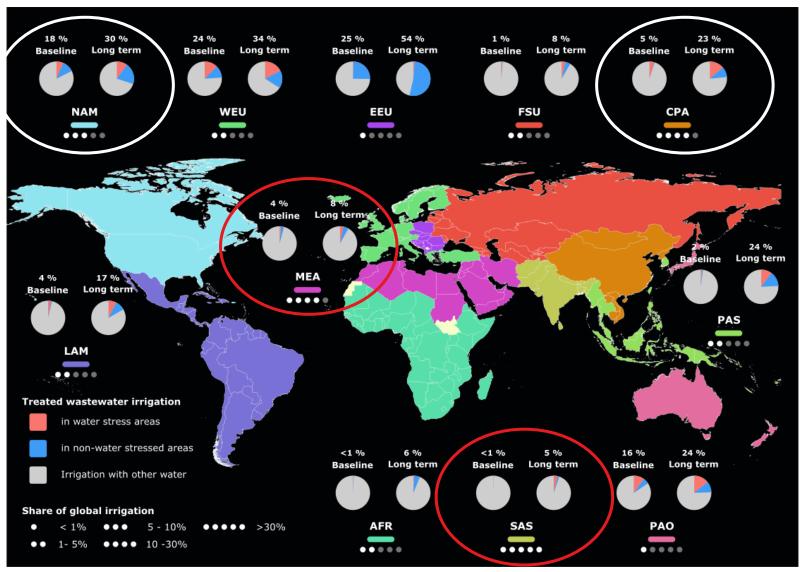
Treated wastewater can reach substantial irrigation shares





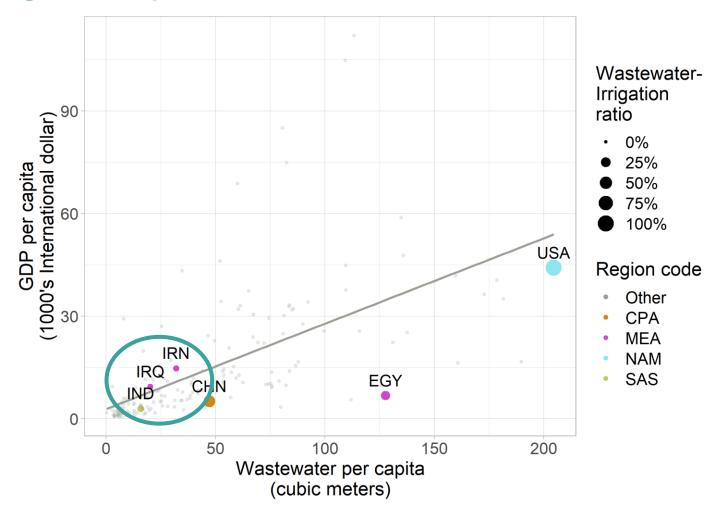
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Irrigation share in major irrigated regions



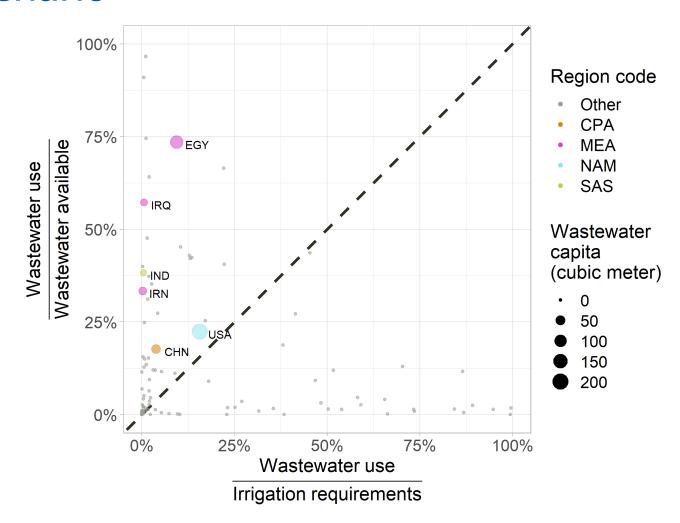


Economic growth can increase wastewater irrigation potential



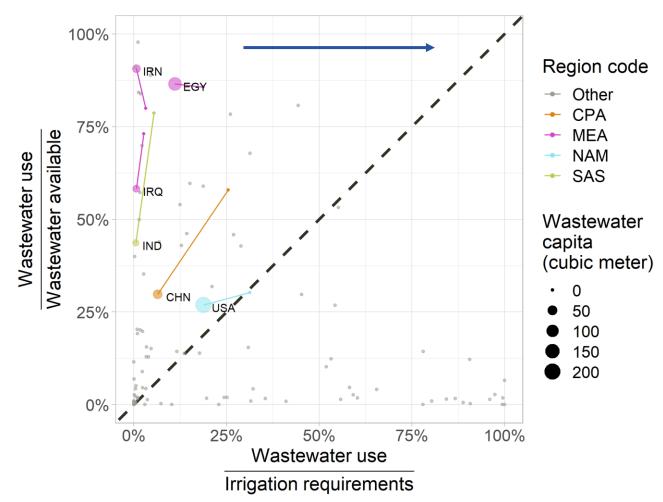


Wastewater reclamation at baseline scenario



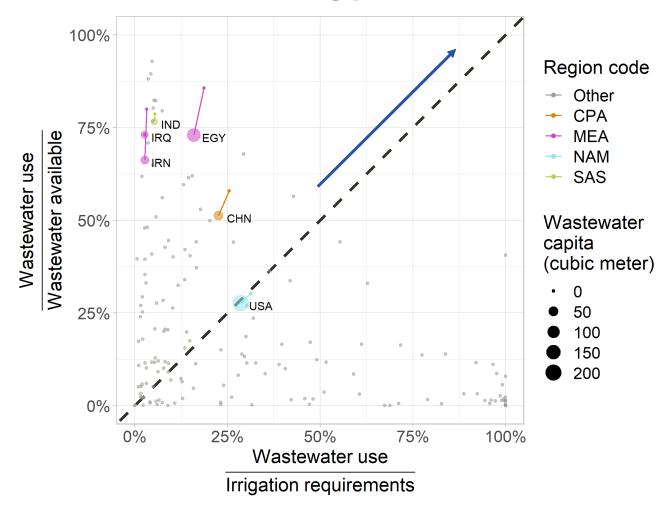


Investments in wastewater treatment plants as an expansion strategy



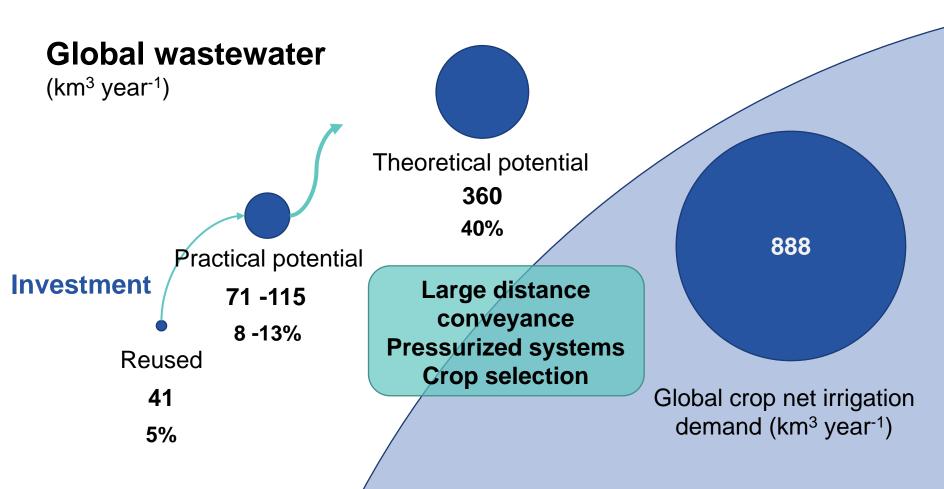


Wastewater conveyance as an intensification strategy



Bridging the gap between the 'practical' and 'theoretical'





Mekonnen and Hoekstra, 2011; Jones et al., 2021

Global crops' water footprint: 7,404 km³ year⁻¹



Thank you for listening.

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