



Seeking sustainability

Reflections on wastewater use in agriculture

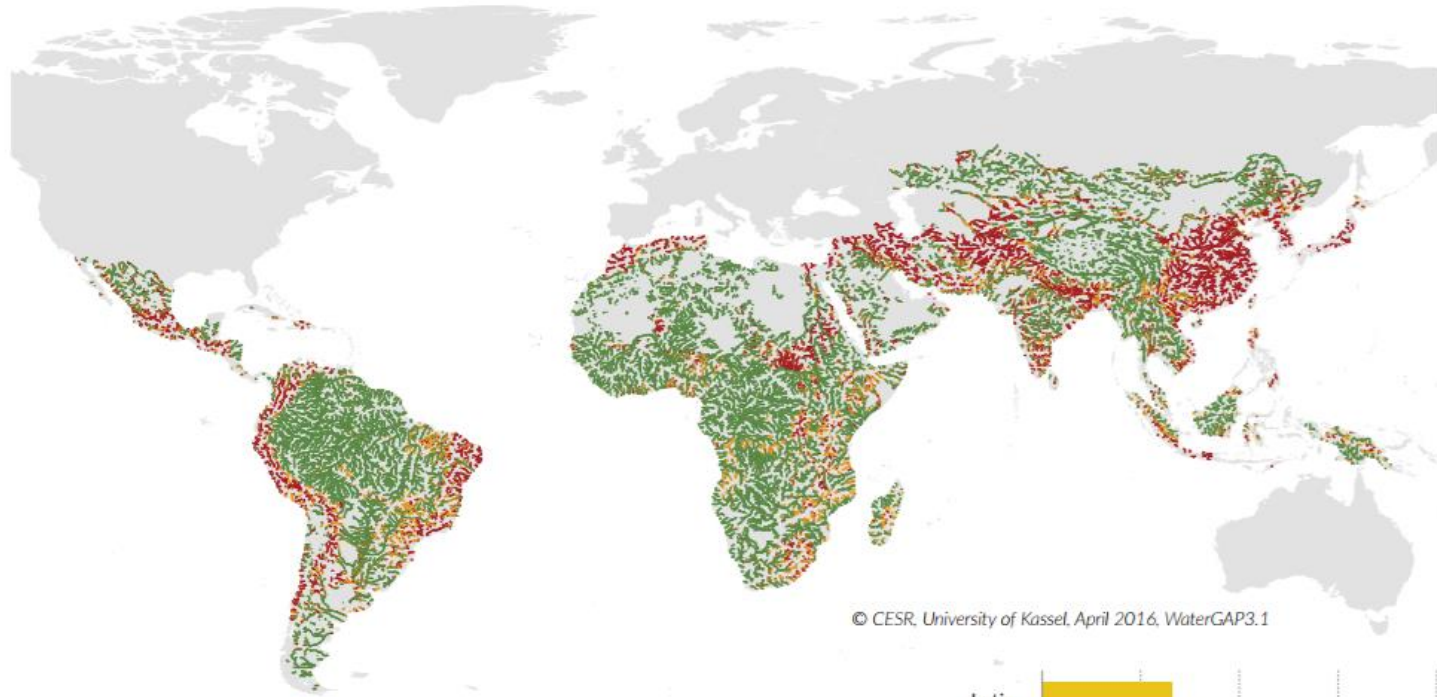
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Pay Drechsel, IWMI*

Some trends

- Population growth has outpaced gains in sanitation and drinking water coverage, especially in urban areas
- Little wastewater is treated globally, and use of wastewater in irrigated agriculture widespread
- By 2030, global demand for energy and water is expected to grow by 40% and 50%, respectively (UN Habitat)



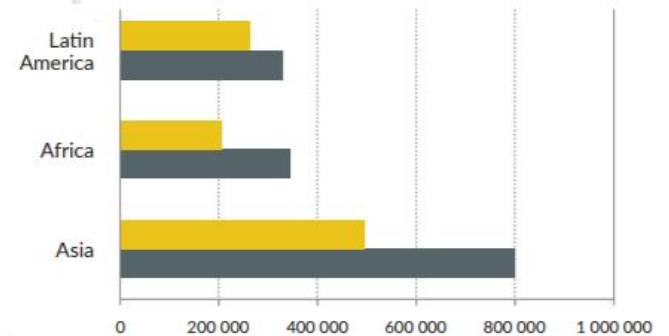
Estimated in-stream concentrations of faecal coliform bacteria (FC)



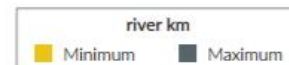
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February 2008–2010
FC [cfu/100ml]

- Not computed
- Low pollution (≤ 200)
- Moderate pollution ($200 < x \leq 1000$)
- Severe pollution (> 1000)



Notes: *Low*: Suitable for primary contact; *Moderate*: Suitable for irrigation; *Severe*: Exceeds thresholds



Wastewater, agriculture and the sustainable development agenda

6 CLEAN WATER
AND SANITATION



SDG Target 6.3 Halving the proportion of untreated wastewater and substantially increasing recycling, and safe reuse globally

Opportunities for synergies with other Goals



- Potential to leverage investments and political will, but what are strongest interactions?
- What potential trade-offs exist?



Sanitation is a basic service and a prerequisite for escaping the poverty trap

Poor sanitation, malnutrition and stunting are linked; safe reuse of sanitation byproducts increases crop yields

Sanitation protects and promotes human health by breaking disease cycles

Sanitation is essential to safe education facilities

Sustainable sanitation reduces gender disparities at home and in public facilities

Sanitation byproducts as alternative fuels for industry, cooking and lighting

Some steps in the sanitation service chain generate opportunities for micro, small, and medium-sized enterprises

Sustainable sanitation requires capacity development at all levels, including of local communities in sanitation management

1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

4 QUALITY EDUCATION

5 GENDER EQUALITY

7 AFFORDABLE AND CLEAN ENERGY

8 DECENT WORK AND ECONOMIC GROWTH

17 PARTNERSHIPS FOR THE GOALS

Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

11 SUSTAINABLE CITIES AND COMMUNITIES

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

14 LIFE BELOW WATER

15 LIFE ON LAND

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

SUSTAINABLE SANITATION

Water and sanitation systems are basic infrastructure required for any industrial development

Sanitation is one of the basic urban services and required to provide a clean and livable environment

Sustainable sanitation systems can contribute to the efficient use of natural resources and reduced waste production

Sustainable sanitation systems can be climate-resilient; improved waste resource recovery and management are important climate-mitigation strategies

Sustainable sanitation reduces marine pollution and contributes to conservation and restoration of terrestrial ecosystems

Basic services such as sanitation for all are important pillars for equality, social justice and a peaceful society

Sustainable sanitation requires international cooperation and developing partnerships in sanitation-related activities



Examples of interactions

- Reduction of GHG emissions and climate action
- Preventing release of organic matter and nutrients reduces degradation of aquatic ecosystems
- Contributions to food security, particularly in urban areas

Table 6 | **Examples of Climate Actions that Align with SDG 6**



SDG 6: Ensure availability and sustainable management of water and sanitation for all

SELECTED TARGETS

Target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

SELECTED EXAMPLES FROM INDCS

Improve water quality

“Morocco’s vision for adaptation involves several quantified sectorial goals for 2020 and 2030. [...] Improved performances of drinking and industrial water systems; connection to the sewerage system and wastewater treatment to reach 100% of urban areas; wastewater treatment to reach 100%.” (Morocco, Goals to build resilience - Goals for 2030)⁸¹

Northrop et al. 2016



6.3 By 2030, ... to substantially increase recycling and safe **reuse** globally



The challenge in many developing countries is not the planned expansion of treated wastewater reuse.

Globally less than 1m ha

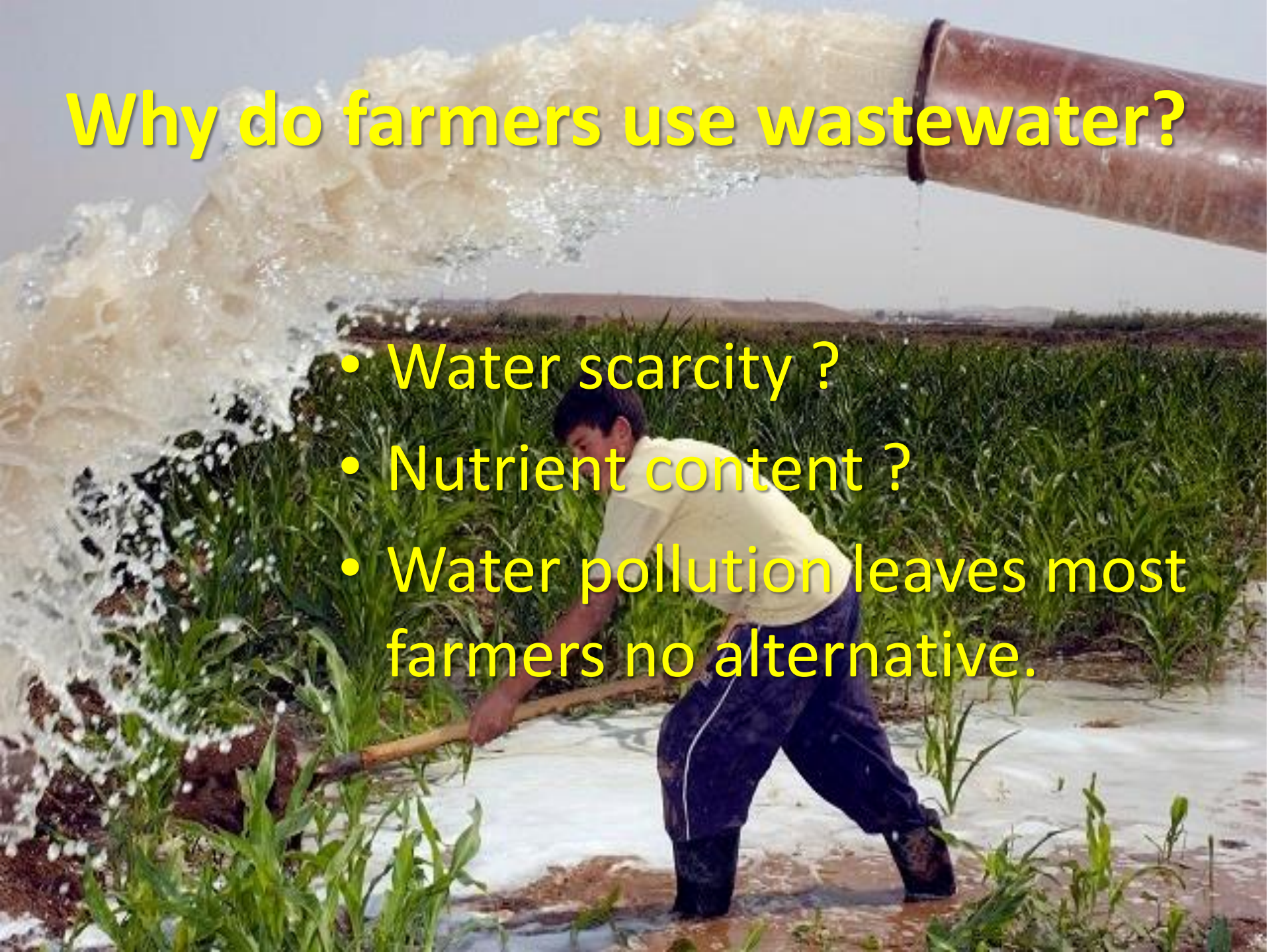




**The larger challenge are the 30 m ha
under (diluted) untreated
wastewater irrigation**

Why do farmers use wastewater?

- Water scarcity ?
- Nutrient content ?
- Water pollution leaves most farmers no alternative.





6.3 By 2030, ... to substantially increase recycling and **safe** reuse globally

- Max. 100,000 ha under treated wastewater irrigation.
- Enough wastewater to directly irrigate up to 1,000,000 ha.
- Up to 8,000,000 ha of crops already irrigated with water containing untreated wastewater (Thebo et al., 2017)





6.3 By 2030, ... to substantially increase recycling and safe reuse globally

The implication is that for progressing on the **reuse** target of 6.3, countries like India have two options:

- Creating new farmland for treated wastewater? [1m ha]
- Investing in safety where wastewater is already used (via treatment and/or non-treatment options). [8m ha]

What are some future opportunities, and the next gaps that need to be addressed, in research and practice?

Interview Panel

