



The Braunschweig water reuse scheme

DYNAMIC REGIONAL SESSION

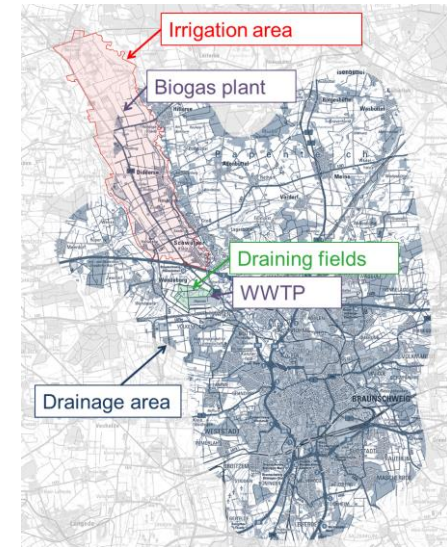
**Dr. Franziska Gromadecki
Janina Heinze**

Pathways to Extend Sustainable Water Reuse Practices in Europe
SUWANU EUROPE International Conference
18th May 2021

The Braunschweig water reuse scheme

Abwasserverband Braunschweig

- Organizational form: Water and ground association
- Members:
 - Customers reclaimed water: 434 agricultural landowners
 - Wastewater suppliers: City of Braunschweig, Local municipalities
- Owner of wastewater treatment plant → not responsible for operation
- Main activity:
 - Agricultural irrigation of reclaimed water



The Braunschweig water reuse scheme

Wastewater Treatment Plant

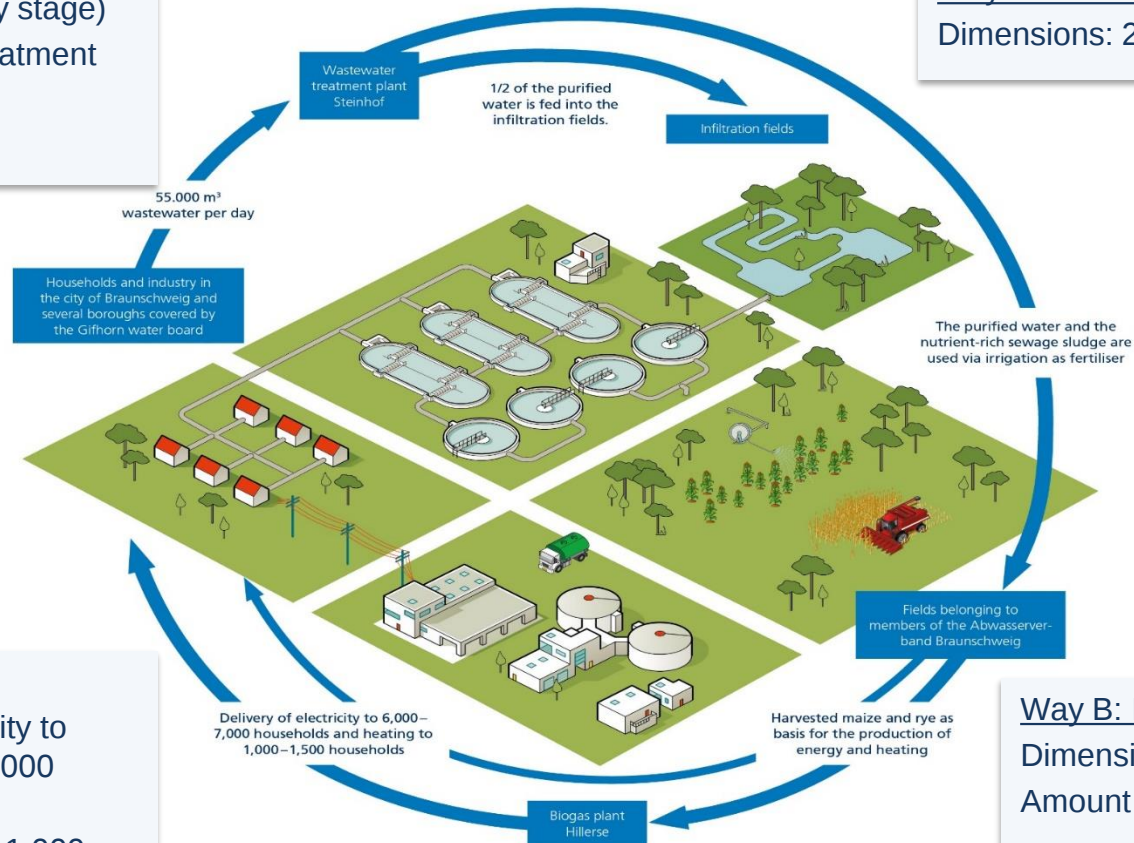
Population equivalents: 385,000

Treatment process:

- Mechanical (primary stage)
- Biological (secondary stage)
- Anaerobic sludge treatment
- Nutrient recovery
- No disinfection unit

Way A: Drainage Area

Dimensions: 275 ha



Biogas Plant

- Delivery of electricity to 6,000 – 7,000 households
- Delivery of heat to 1,000 – 1,500 households

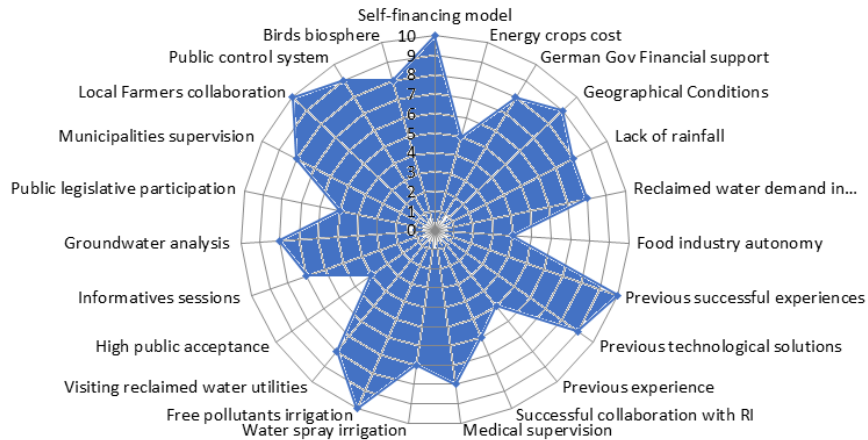
Way B: Irrigation Area

Dimensions: 3,000 ha
Amount 10 Mio m³/a

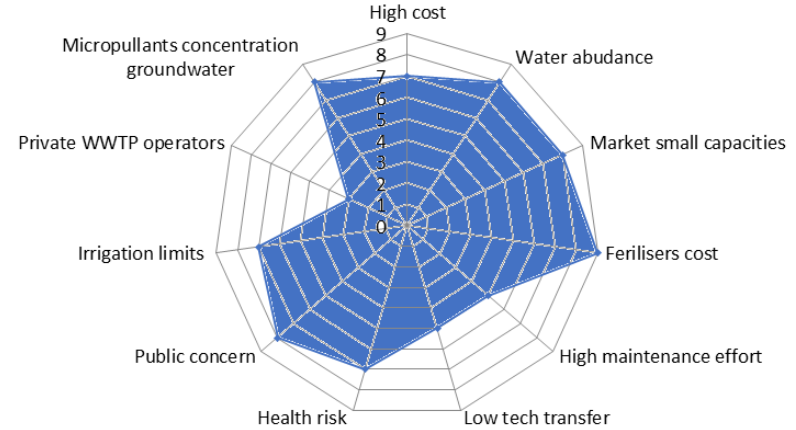
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SWOT - Overview

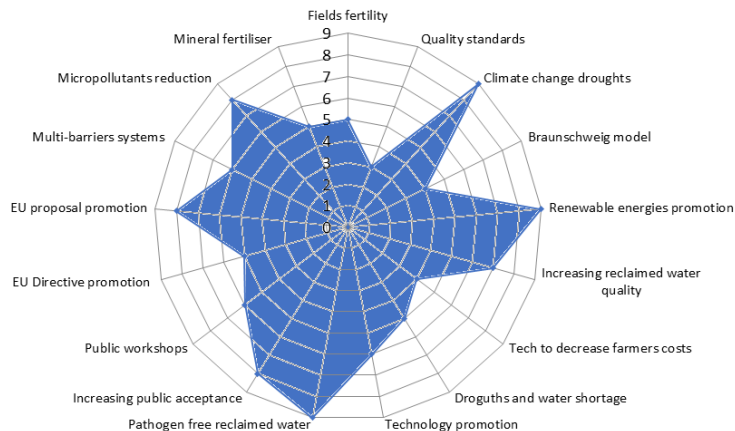
Strengths



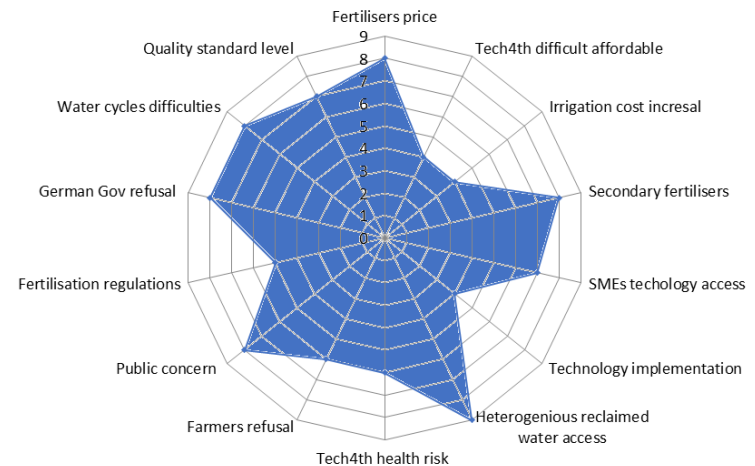
Weaknesses



Opportunities



Threats



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SWOT - Examples

Strengths

- Self-financing model
- Previous successful experiences
- Free pollutants irrigation
- Local farmers collaboration
- Public control system

Weaknesses

- Fertilisers costs
- Market small capacities
- Public concern
- Health risk
- Micropollutants concentration groundwater

Opportunities

- Climate change droughts
- Renewable energies promotion
- Pathogen free reclaimed water
- Increasing public acceptance
- Micropollutants reduction

Threats

- Heterogeneous reclaimed water access
- Public concern
- Water cycles difficulties
- Secondary fertilisers



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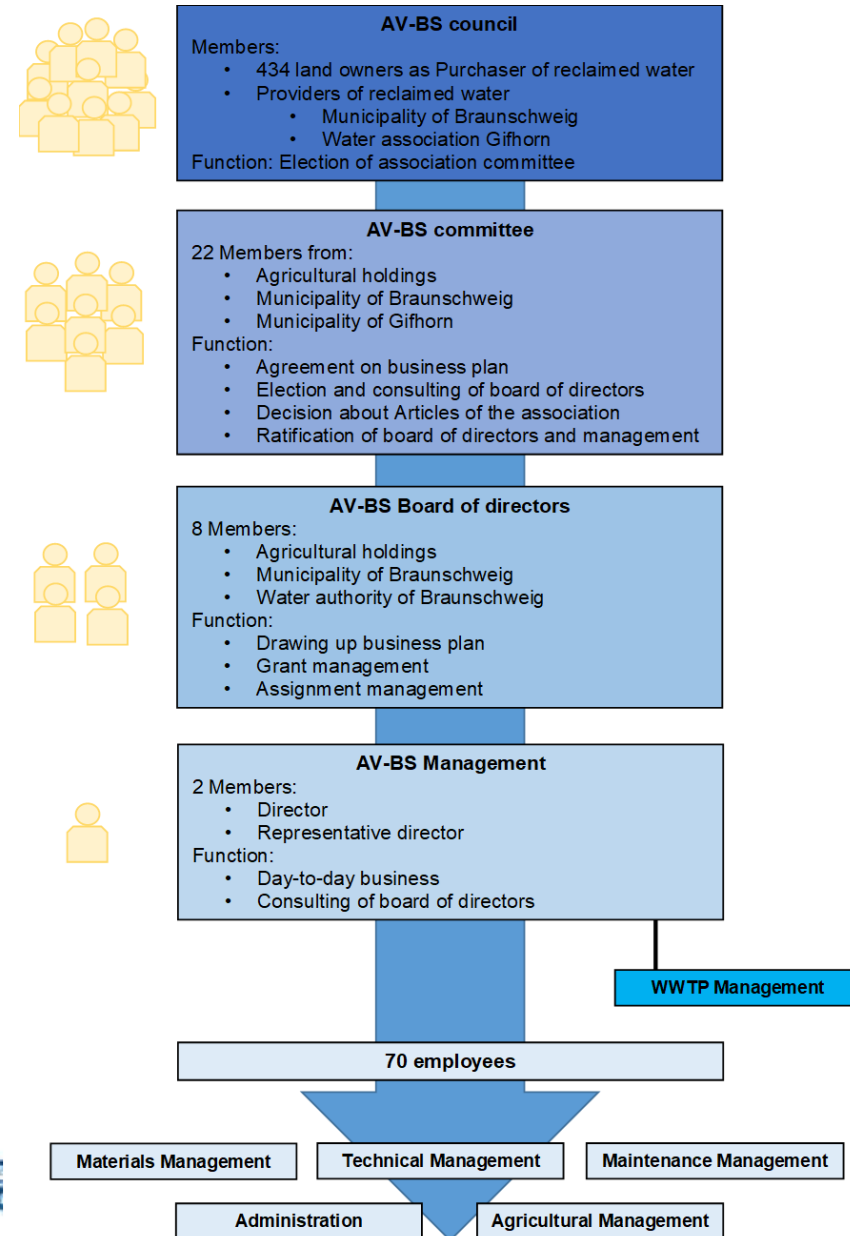
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The Braunschweig water reuse Regional working groups

- Close network for almost 70 years
- Established meetings between all relevant actors
- Meeting with governing and opposition parties
- Conclusions:
 - Analysis of multi-resistance bacteria
 - Bacteria reduction along reuse process
 - Support of policy makers



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Workshops

Workshop in Braunschweig, June 2019, 55 relevant Stakeholders

- Presentation of the reuse scheme and importance of water reclamation
- Technical and legal background about the BS water reuse scheme

Conclusions:

- Main challenge: Elimination of micropollutants
- Further meetings
- Further research projects:
 - Monitoring multiresistent bacteria
 - Elaboration of risk management plan for Braunschweig water reuse scheme within national research project ‚FlexTreat‘ started in February 2021



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Barrier: EC-regulation on minimum requirements for water reuse

Table 1 – Classes of reclaimed water quality and permitted agricultural use and irrigation method

Minimum reclaimed water quality class	Crop category (*)	Irrigation method
A	All food crops consumed raw where the edible part is in direct contact with reclaimed water and root crops consumed raw	All irrigation methods
B	Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, <u>processed food crops and non-food crops</u> including crops used to feed milk- or meat-producing animals	All irrigation methods
C	Food crops consumed raw where the edible part is produced above ground and is not in direct contact with reclaimed water, processed food crops and non-food crops including crops used to feed milk- or meat-producing animals	Drip irrigation (**) or other irrigation method that avoids direct contact with the edible part of the crop

Table 2 – Reclaimed water quality requirements for agricultural irrigation

Reclaimed water quality class	Indicative technology target	Quality requirements				
		<i>E. coli</i> (number/100 ml)	BOD ₅ (mg/l)	TSS (mg/l)	Turbidity (NTU)	Other
A	Secondary treatment, filtration, and disinfection	≤ 10	≤ 10	≤ 10	≤ 5	<i>Legionella</i> spp.: < 1 000 cfu/l where there is a risk of aerosolisation Intestinal nematodes (helminth eggs): ≤ 1 egg/l for irrigation of pastures or forage
B	Secondary treatment, and disinfection	≤ 100	In accordance with Directive 91/271/EEC (Annex I, Table 1)	In accordance with Directive 91/271/EEC (Annex I, Table 1)	-	
C	Secondary treatment, and disinfection	≤ 1 000			-	
D	Secondary treatment, and disinfection	≤ 10 000			-	

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Future challenges and opportunities

Challenges

- Need of implementation of disinfection stage until mid 2023
- Elaboration of risk management plan
- German strategy on micro pollutants
 - additional requirements for reclaimed water
- Sludge co-irrigation

Opportunities

- Providing continuous legal basis for water reuse in Braunschweig
- Design of multi-barrier system with respect to hygienic and environmental risks (risk management)
- Extending range of field crops
 - diversification of cultivation risks for farmers





Thank you for your attention!

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