Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

Overview of the pilot status

Recycling treated wastewater for irrigating green spaces

Kalmar Municipality

30 April 2025

Kalmar

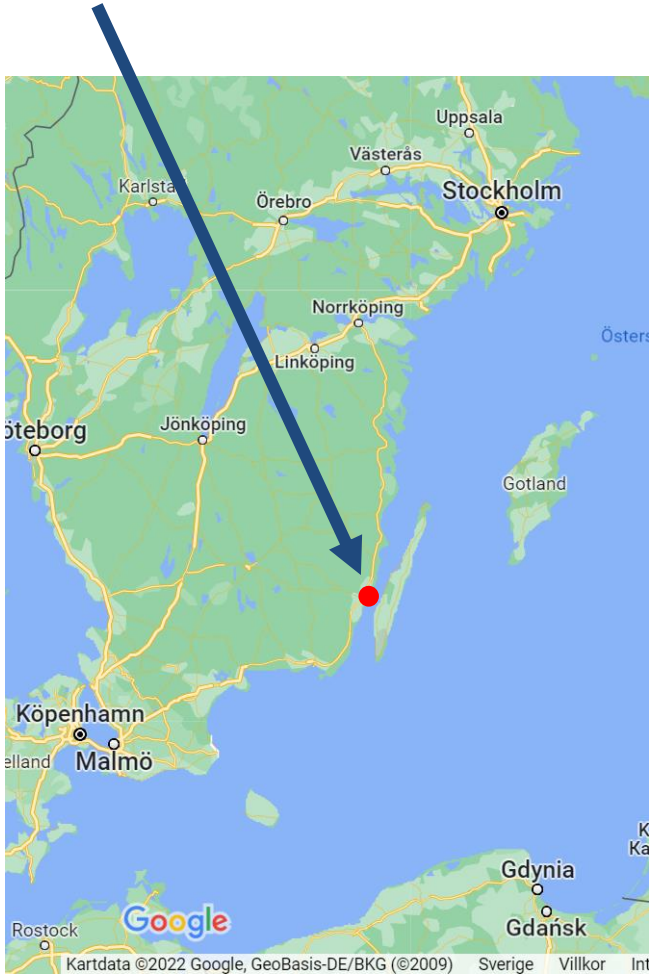
Location: at the Baltic Sea.

Rural / agriculture / forestry.

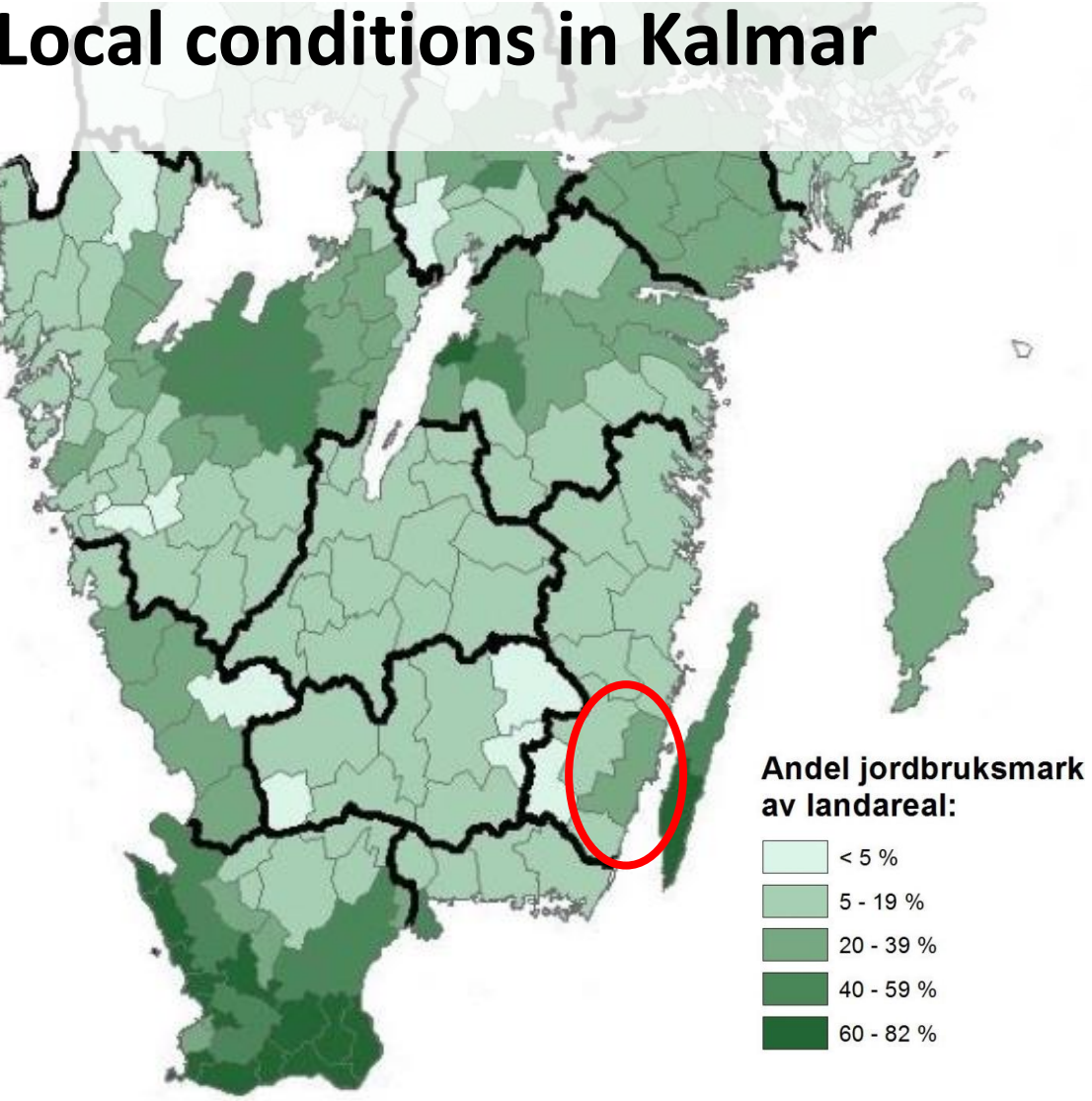
Climate resilience challenges:

- higher sea levels,
- dryer summers,
- increased frequency of intensive rainfall,
- threatened aquatic ecosystems.

The consequences will most likely be increased water scarcity



Local conditions in Kalmar



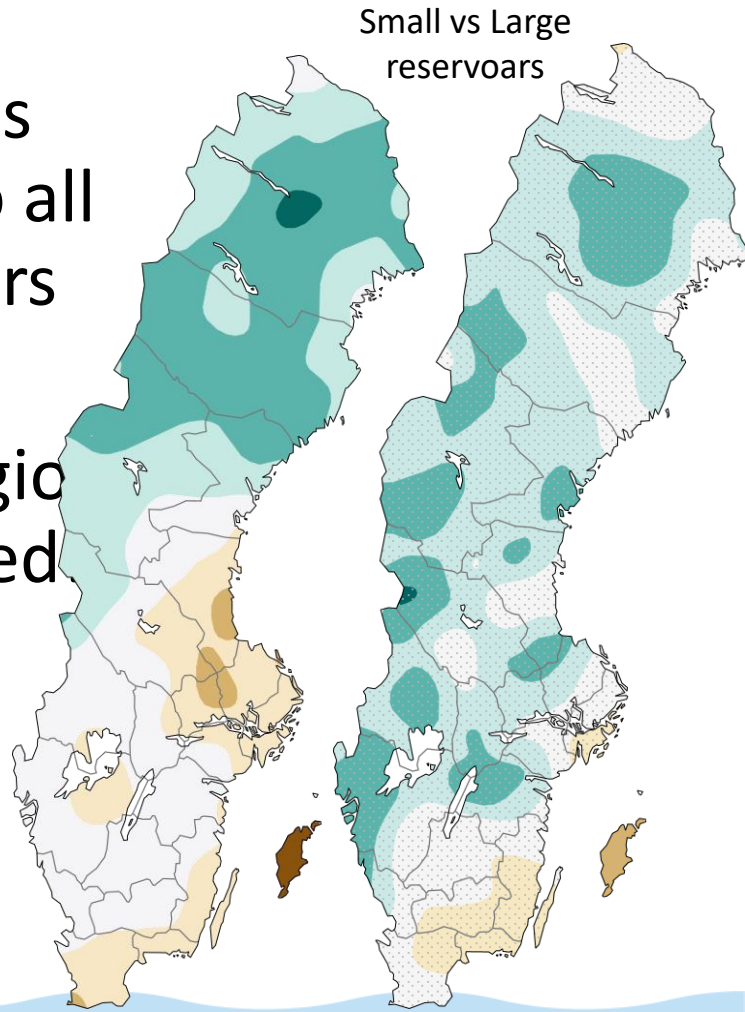
Rural / forestry / agriculture areas are dominating

Large water demands during summer

Comparisons of goundwater levels 1961-2023

- Today's levels compared to all previous years

→ Kalmar regio is very exposed



What and why?

“Re-use of wastewater for irrigation by UV-light disinfection”

Background and current situation:

- Irrigation of trees and other plants
- Manual irrigation, tanktrailer with hose reel
- Consumption ca 1 500 m³ per year mainly young trees
- Watersource: Retained rainwater from streets etc. stored in dams
- Uncertain supply during long lasting drought, quality issues
- Dep. of sportfields also looking for alternative to drinkingwater

Pilot project idea: Reuse of wastewater in Kalmar

Reuse wastewater from Kalmar municipal WWTP after UV-treatment in additional disinfection stage for irrigation of parks, trees etc.

Be prepared for changing climate conditions

Secure long term supply of water for irrigation also under severe drought-periods

Save water resources

Gain experiences to be used in other future projects - soccerfields, street-maintanence

Inform staff and public of background, purpose and increase acceptance for reuse of wastewater

Waste water: Disgusting and dangerous!? Not if handled properly!

- Waste water contains harmful bacteria
- Be aware of the risks
- Handle with respect to risks
- Reduce levels of bacteria
- Monitor quality (disinfection efficacy)
- Educate staff
- Be transparent
- Inform the public

Risk assessment and management

Hazards are identified and risks are assessed for:

- Staff – regarding health and working conditions
- General public – regarding health
- External environment – regarding soil, water, flora, fauna
- Department of Parks – regarding operational needs for irrigation water

- The identified hazards and risks as well as proper management and mitigation procedures and methods for avoidance and minimization are described in a risk analysis and management plan.
  - Designated persons have defined responsibilities in that plan.

- More detailed management plans must be outlined when design is known and before start of plant.

Technical solution – UV-light disinfection

- Very effective to reduce most microorgansims
- No need for additional chemicals, less risk for staff and environment
- Moderate energy consumption – run only on demand
- Fairly easy to use – quick start-up, relatively low need for maintenance
- Built in container, easy moving and flexibility – install where need is

Technical setup as planned

- UV-light as method for disinfection
- Filters to increase efficiency of UV-light
- Pumps to feed wastewater through UV-light and filters, fill tanktrailer
- Minimum capacity: 600 l/min
- Processors to direct and control operation (PLC)
- Portable, built in a container
- Intermittent operation, direct feed to tanktrailer, no storage tank
- Remote control using smartphones
- Different safety measures built in, quality of water, overfilling etc.
- Distribution with tanktrailers
- Manual application with hose

Location UV-plant – access WW, water filling station

- Easy access-point to wastewater-source
- Favourable location for distribution within Kalmar city and vicinity

Inside feeding point wastewater to UV-plant →

Pilot project in Kalmar: Recycled water from UV-disinfection plant

We wanted to invest in disinfection of treated sewer water from the municipal WWTP in order to have access to a reliable water supply also during severe drought. The disinfection method is ultraviolet light. It is effective against most microorganisms, simple to handle and relatively cheap.

Aiming for class B-water quality (E.coli) < 100 CFU/100 ml. Comment: We had to settle for class B quality water due to budget constraints. The contractor who submitted the bid could not guarantee class A within a cost that was covered by our budget.

Result in operation: Class A-water (E.coli) < 10 CFU/100 ml)

Controlprogram according to EU 2020/741.

Sampling of water once/week – bacteria E.coli, TSS, turbidity etc.

Aiming to add online turbidity meter for next season to be able to track the incoming quality of water in real-time and shut down in case turbidity is above the threshold for effective UV-disinfection.

UV-treatment plant built in a mobile standard container:

Adding coarse filter

Winterservice revealed stones inside the backwash filter.

Before the new season 2025 we therefore added a coarse sieve on inlet to remove gravel particles and prevent them from damaging pressure pump.

Installation of Turbidity meter

When: After first season 2024.

Why: To be able to track the incoming quality of water in real-time and shut down in case turbidity is above the threshold for effective UV-disinfection.

1. Envisaged users of recycled water - Kalmar municipality

Department of Parks:

- Irrigation of trees and plants
- Establishing phase – 3 years
- 1500 m³/year

© Kalmar Municipality

1. *Future* envisaged users of recycled water - Kalmar municipality

DEPARTMENT OF STREETS – CLEANING AND DUST REDUCTION

~1 000-1 600 M³/YEAR

DEPARTMENT OF CULTURE AND SPORTS / FOTBALLFIELDS

~10 000 M³/YEAR

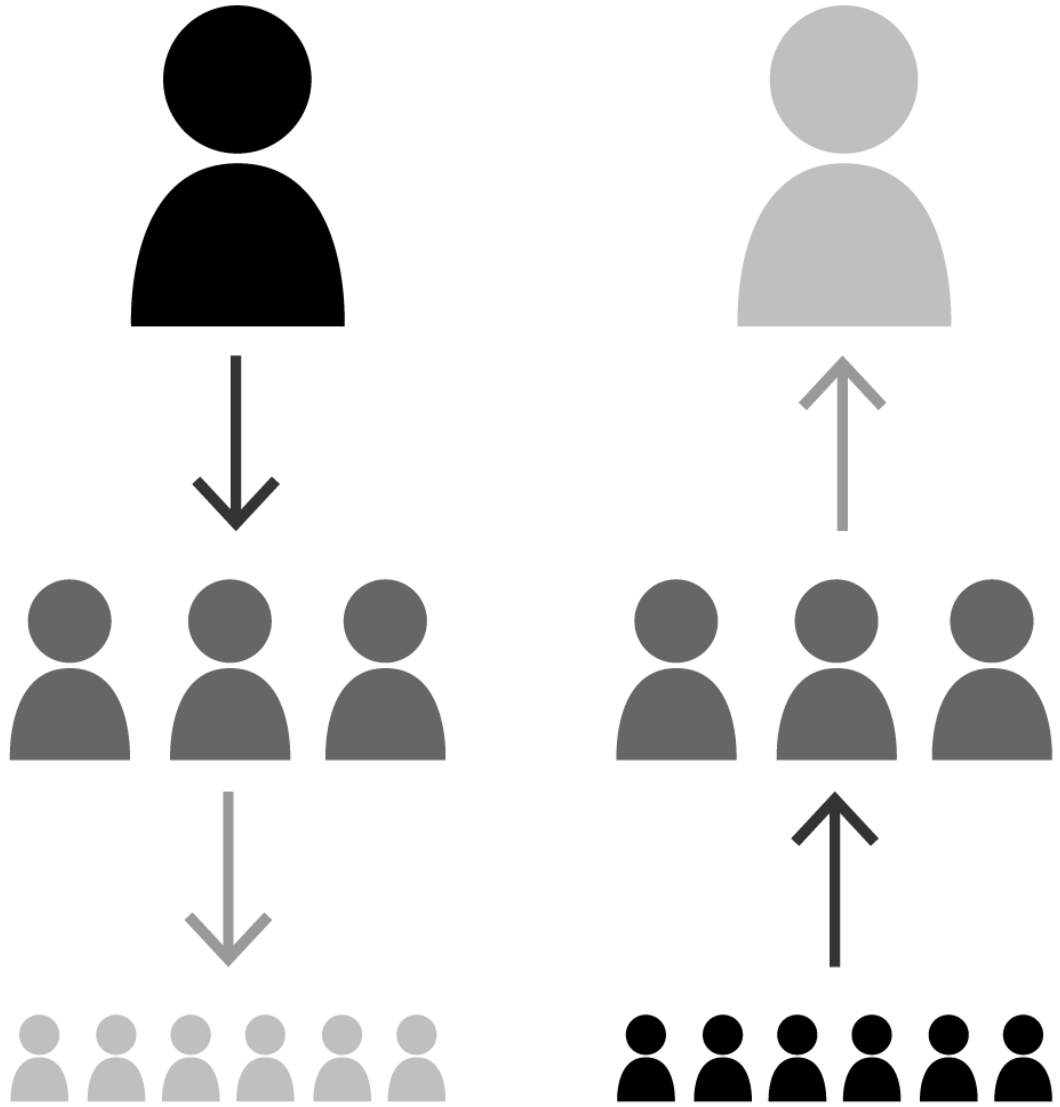
CLEANING OF MACHINERY, TRUCKS

~500 M³/YEAR

2. Involving new users

Communication important!

- Consultation
- Be transparent
- Explain why, how and when
- Be open with risks and how to manage/minimize them
- Involve staff early in process



2. Involving new users

- Personal contact - Explaining background regarding importance of reusing water and the pilot project.
- Invited politicians into the project – show plant in operation, usage of recycled water, present possible additional areas of use.
- Explaining the technique and potential areas of use for reused water.
- Suggesting practical solutions as well as economic and legal (pre)conditions.
- Share experiences from preparations and operation of UV-plant.
- Involve all parties – from management to ”on-the-ground” staff.

3. Evaluation - implemented

- Risk assessment based on the intended use (irrigation)
  - Human health
  - Environmental impact

- Compliance with standards and regulations

- Regular monitoring and validation according to the EU 2020/741 regulation

- Visual inspections of plants.

- Cost-Benefit analysis
  - Measure volumes of drinking water that are replaced by reused water.
  - Operational ease and mantainence.

3. Evaluation – good to have in longer perspective

Soil impact i.e., salinity, pH, nutrients and soil health such as organic material and microbial activity.

Evaluate how the water quality will interact with soil, especially in agricultural settings. High salinity or improper pH levels can affect soil health and crop.

Potential external users (non – municipal)

→questions around legal issues, economy and financing.

Waste companies

Construction contractor

Transport/Shaft/Garden

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Access the „BSR Water Recycling Toolbox" here.
https://www.eurobalt.org/waterrecyclingtoolbox/

SUSTAINABLE WATERS
WaterMan

The „BSR Water Recycling Toolbox" was elaborated as part of the project "WaterMan - Promoting water reuse in the Baltic Sea Region through capacity building at local level", The project is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a region-specific approach to water recycling, which intends to use the alternation of too much and too little water that has become typical in the Baltic Sea Region to make the local water supply more resilient, and supports municipalities & water companies in adapting their strategies.