

Info-package 2

Agricultural Advisory Services

Fact Sheet 2.5 – Water reuse initiatives in agriculture in Europe: facts and figures



Costs benefits analysis and
feasibility of using reclaimed
water

Irrigation schemes
when using
reclaimed water

Water and fertilizer
savings when using
reclaimed water

Using reclaimed
water in closed
hydroponic systems
requires focus on
sodium

Water reuse
initiatives in
agriculture in
Europe

SUWANU EUROPE is a H2020 project aiming to promote the effective exchange of knowledge, experience and skills among practitioners and relevant actors on the use of reclaimed water in agriculture. This factsheet is part of a total of 5 factsheets in Info-package 2 aimed at agricultural advisors, that describes the water reuse initiatives in Europe.

1. Introduction

In the light of the European Union's agreed proposal on minimum requirements for the reuse of water in the agricultural sector (COM/2018/337), it is relevant to understand to which extent, where and how this practice has found implementation in Europe. Previous work has been done in mapping water reuse schemes in Europe. The AQUAREC project (Bixio & Wintgens, 2006) and Water Reuse Europe (Water Reuse Europe, 2018) identified several European water reuse initiatives in agricultural, industrial or urban applications. The SuWaNu Europe project resulted in the largest collection of water reuse initiatives specifically intended for agricultural irrigation. Besides their identification and geographical distributions, information was retrieved on initiatives' size, implementation stage, water sources, farming systems, irrigation methods, water reclamation treatments, distribution systems, costs, user agreements... This resulted in overview maps, an online public database and an analysis report of existing practices and research projects reusing water for agriculture in Europe.

2. Water reuse initiatives in agriculture in Europe

A total of 79 initiatives using reclaimed water for agricultural irrigation in Europe were mapped. The collection needs to be considered as a non-exhaustive listing and evaluation of initiatives using reclaimed water in the agricultural sector. Initiatives were selected for their 'demonstrative character' referring to for example the possibility to visit the initiatives. The list contains representative and innovative cases that capture the wide variety of reuse possibilities across the countries in the SuWaNu Europe consortium.

3. Size of water reuse initiatives

The collected reuse initiatives differ in size. Figure 1 shows the annually reclaimed water volume used for irrigation across the initiatives, clearly identifying several hotspots in Europe. The largest ones are situated on the Spanish coast between the cities of Almería and Valencia which counts 7 locations reusing water to irrigate more than 2,000 hectares. In the area to the East of Hannover in Germany, a concentration of three middle- to large-scale initiatives have found implementation. Furthermore, two reclamation plant reclaim Milan's urban wastewater to provide irrigation water to 28,000 hectares of agricultural land. The islands of Crete and Cyprus harbour a high concentration of middle-scale initiatives specifically intended for agriculture reuse. The Netherlands and Flanders (Belgium), the Department of Occitan (France), the Western part of Andalucía (Spain), Alentejo (Portugal) and Puglia (Italy) are regions with a moderate concentration of small-scale initiatives – often yet in the pilot or research phase.

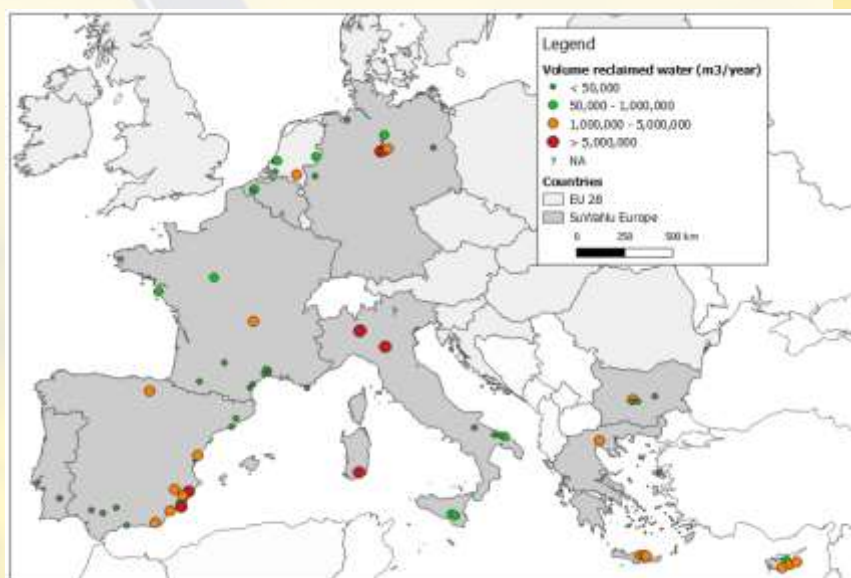


Figure 1 Annual volume reclaimed water (m3) per initiative

4. Reclaimed water sources

The water reclaimed for the agricultural sector has different origins. This strongly determines the initial water quality and by consequence the treatment requirements or irrigation purposes. The review differentiates the initiatives using wastewater from municipal origin (59) from the ones specifically reusing the effluents of the food processing industry (10). A minority of the initiatives includes wastewater from another origin.

5. Agricultural end-uses

The risk exposure of reclaimed water to health and environment depends on the agricultural use, the crop cultivated and the applied irrigation method. Regarding these previously mentioned criteria, the JRC assigned minimum reclaimed water quality norms and monitoring frequencies (Alcalde-Sanz et al., 2017). Northern European countries predominantly use reclaimed water to irrigate arable crops. Whereas, Southern European countries apply reclaimed water more often to permanent crops. The irrigation method defines to which extent the edible parts of the crops are in contact with the reclaimed water. More than 65% of the collected reuse initiatives make use of drip irrigation to supply the reclaimed water to the crops. This category contains both drip irrigation supplied below ground (sub-surface irrigation) as drip lines placed at the soil surface. Also for greenhouse crops the supply of reclaimed water is often through drip irrigation. The database counted 14 initiatives applying the reclaimed water with sprinkler irrigation.

6. Water reclamation treatment

In general, secondary treatment refers to the mandatory wastewater treatment allowing to discharge treated wastewater into freshwater. This water must comply with the Urban Waste Water Directive 91/271/EEC. A treatment beyond secondary treatment is necessary to allow the use of treated water for irrigation purposes. Figure 2 shows the use of advanced treatment trains across the recorded initiatives. After the secondary treatment many Mediterranean countries perform coagulation-flocculation, sand filtration and disinfection. This technique is carried out in 18 initiatives, including most of the largest and fully-operational reuse schemes.

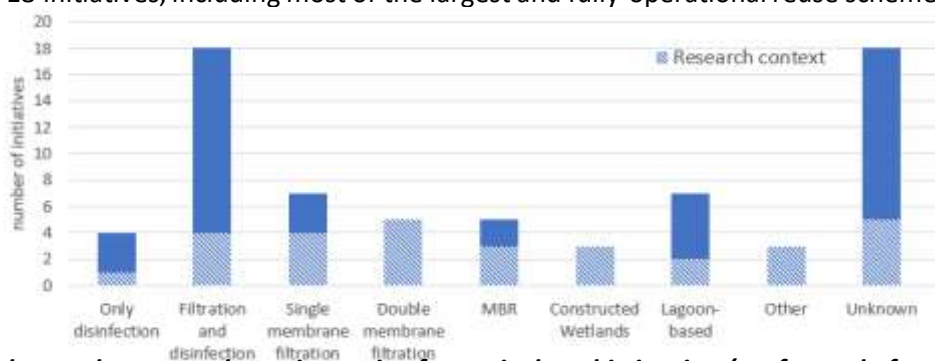


Figure 2 Advanced water reclamation trains for agricultural irrigation (performed after the secondary treatment)

Further information

- The **online initiative database** (<https://suwanu-europe.eu/database/>) contains the collected and summarized reclaimed water projects. When entering the “Initiatives” landing page, visitors have access to a broad range of search options, allowing them to perform geographical, thematic or keyword searches. Users willing to find out more, can click on the initiatives and will be guided to a more detailed information page.
- **Deliverable 1.2 Review of existing knowledge, material and links** (accessible on the project’s website) gives a detailed description of the database including many maps and figures.

References

- [1] Alcalde-Sanz, L., & Gawlik, B. M. (2017). Minimum quality requirements for water reuse in agricultural irrigation and aquifer recharge Towards a water reuse regulatory instrument at EU level. EUR 28962 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-77176-7, doi 10.2760/887727, PUBSY No.109291
- [2] Bixio, D., Thoeve, C., Wintgens, T., Hochstrat, R., Melin, T., Chikurel, H., ... Durham, B. (2006). Wastewater Reclamation and Reuse in the European Union and Israel: Status Quo and Future Prospects. International Review for Environmental Strategies, 6 (2), 251–268.
- [3] Water Reuse Europe. (2018). Water Reuse Europe Review 2018.

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