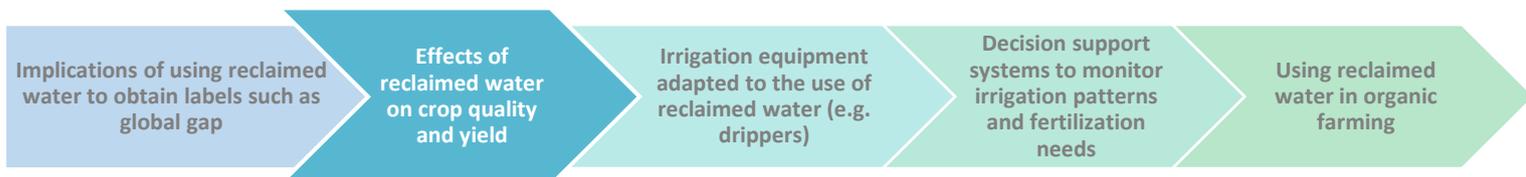




Info-package 1

Farmers/Irrigators

Fact Sheet 1.2 – Effects of reclaimed water on crop quality and yield: facts and figures



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 1 aimed at famers and irrigators, that describe the effects of using relcaimed water on crop quality and yield.

1. Introduction:

The use of reclaimed water (RW) improves the regions' self-sufficiency and is also a local quality resource, often more reliable than other conventional sources. For this reason, its use for agricultural purposes is expected to grow exponentially in the coming years. For instance, in semi arid regions, its use in agriculture plays a key role contributing in tackling water scarcity and droughts. Several field studies conclude that crop quality and yield using RW vary among crops. In conclusion, they have compared different irrigation techniques and water sources like reclaimed, surface, ground or desalinated water.

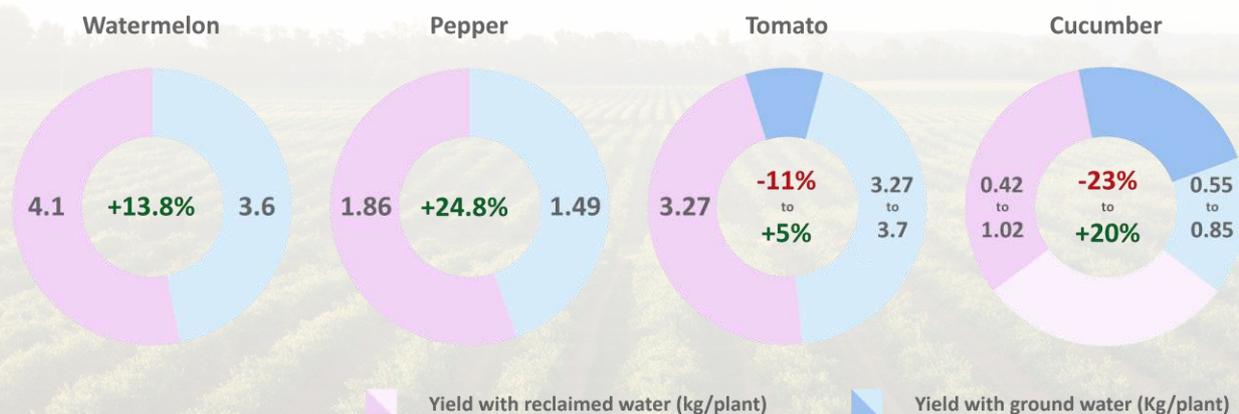


Figure 1: Variation in yield, reclaimed water vs. surface water

2. Crop Behaviour and Yield:

Watermelon: production increases by up to 13%, due to increased physiological activity. As for the content of elements such as N, K, P and Ca, the leaf content is higher in plants irrigated with regenerated water.

Pepper: foliar levels of N and P are slightly lower in plants irrigated with reclaimed water and without additional fertilisation. K levels are higher in peppers irrigated with reclaimed water. In this crop it is important to highlight the increase in yield in 24% of the plants with reclaimed water irrigation application compared to the underground, both cases including additional fertilisation.

Tomato: the nutritional state in the foliar levels shows a very similar behaviour regarding the main macro-elements (N, K, P, Ca, Mg), being the Boron higher in content than that of the RW. In relation to the yield, in some varieties there have been increases of 5% in the yield of the crop irrigated with RW with respect to the groundwater and in others a decrease of 11%.

Cucumber: depending on whether additional fertilisation is applied or not, there is a variation in yield from -23% of RW with respect to groundwater when no additional fertilisation is added to +20% in case of additional fertilisation.

Citrus: trees irrigated with RW generally have greater vigour and produce higher yields compared to surface water irrigation. In addition, less fertilisation is required without affecting the crop yield. On the other hand, the quality and quantity of the fruit is also not affected nor does it show any trend changes. Irrigation with RW has a positive influence on the nutrition of citrus fruits by bringing the concentration of macronutrients, i.e. P, Ca and K, closer to their optimum levels. However, an unbalanced supply of micronutrients in RW can cause a nutritional excess of some micronutrients, including Mn, Zn, Cu and B in citrus plants.

3. Pros and Cons of Using Reclaimed Water in Crop Yields :

PROS 	CONS 
<p>Yield is greater than other water sources such as surface, underground and desalinated water</p> <p>Significant savings in cultivation costs as the amount of fertilizer required to achieve optimum plant performance is reduced</p>	<p>It requires a more exhaustive management of irrigation and fertilisation water, monitoring the content of fertilizing elements in order avoid exceeding the plant's needs</p> <p>It requires control to detect the presence of undesirable elements such as bacteria and pathogens, emerging contaminants, and heavy metals due to problems in water treatment</p>

4. Recommendations:

- ✓ Using reclaimed water in agriculture involves a very important contribution of different elements and nutrients that plants need to produce an optimal yield.
- ✓ This type of water represents a productive improvement in crops, reducing the use of fertilizers.
- ✓ It is necessary to know the composition of the reclaimed water to be used for irrigation, so that the fertilisation requirements of the various crops are supplemented exclusively with the necessary quantities of macro- and micro-elements.
- ✓ It is recommended to control the salinity of the soil when the reclaimed water has a high salt content, as well as to perform pH corrections depending on the stage of the crops, times of the year and irrigation campaigns.

Reference/further readings

Cristina Romero-Trigueros, et al. (2019). Medium-long term effects of saline reclaimed water and regulated deficit irrigation on fruit quality of citrus. Wiley Online Library: 21 November 2019. DOI 10.1002/jsfa.10091

S.Mulet, et al. (2019). Efecto del regadío con aguas regeneradas sobre los suelos, acuíferos y cultivos. Resultados del proyecto de I+D+i EARSAC. Grupo Tragsa. ISBN-13- 978-84-09-15528-6

B.F.F. Pereira, et al. Reclaimed wastewater: Effects on citrus nutrition. Agricultural Water Management 98 (2011) 1828– 1833

CONTACTS:

Coordinator

Rafael Casielles (BIOAZUL SL)
Avenida Manuel Agustin Heredia nº18 1ª4 Málaga (SPAIN)
Mail | info@suwanu-europe.eu Website | www.suwanu-europe.eu

CONTACTS:

Responsible for Factsheet

David Hernández (FENACORE)
Paseo de la Habana, 26, 2ª oficina 2, 28036 Madrid
Website | www.fenacore.org



THIS PROJECT HAS RECEIVED FUNDING FROM
THE EUROPEAN UNION' HORIZON 2020 RESEARCH
AND INNOVATION PROGRAMME
UNDER GRANT AGREEMENT N. 818088

