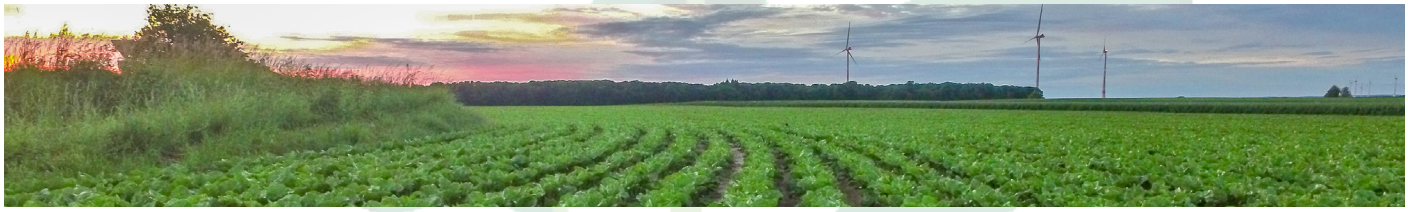
ISSUE BRIEF: WATER

HOW DOES THE EU BEET SUGAR SECTOR GUARANTEE SUSTAINABLE WATER USE?

Water is a vital input for all agricultural products, and sugar beet is no exception. Throughout the world, sources of fresh water are coming under increasing pressure. Agricultural raw materials can make substantial contribution to the overall water impact of finished products. Europe's beet sugar sector has taken numerous steps to improve the water efficiency of its operations, reduce pollution and have a lower impact on local water supplies across Europe.

The European Green Deal and the subsequent release of the Farm to Fork Strategy in May 2020, have the ambition to reconcile nature, farmers, businesses and consumers towards a competitive and sustainable food system. In this brief we would like to provide an overview about sustainable water management in the European Sugar Beet sector.



ON THE FARM

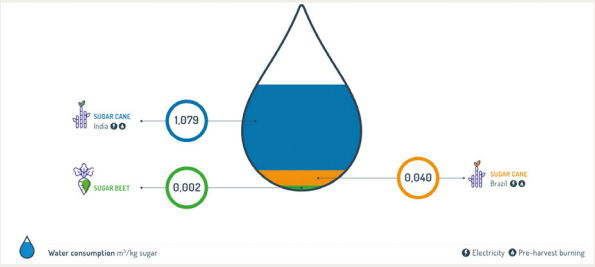
Growing sugar beet requires an average of 550 to 720 mm of water per growing season. Although local rainfall patterns vary enormously across the continent, in most locations rainfall alone is sufficient to sustain the crop, without any adverse impact on local water availability. Notwithstanding the climate-change induced increase risk of prolonged dry spells in recent years, use of irrigation in beet growing remains limited across Europe (approx. 10-15% of total EU beet area).

The most important means of conserving water is to avoid having to use additional water in the first place. Farmers take a range of steps to minimize the need for irrigation and improve the water profile of their sugar beet crops, including irrigation management plans and the use of decision support tools (e.g. Irribet in France, Aqua Facile in Italy). Conservation of topsoil helps reduce evaporation losses (as well as maintaining soil fertility). Careful application of plant protection products and fertilizers, and capturing sediment helps prevent runoff of these materials into water courses. However, some key beet growing regions have experienced drought symptoms in the last 3 years since 2018. Therefore, the sector is looking to new practices, of which new varieties, notably obtained through New Breeding Techniques, to help find rapid solutions (e.g. development of drought stress tolerant varieties) to such (and other resulting, for example pests and diseases) challenges.

CASE STUDY 1: SUGAR BEET VS SUGAR CANE WATER CONSUMPTION

According to a Life Cycle Assessment (LCA) study on beet sugar, cane sugar and glucose syrup, carried out by Blonk Consultants, peer reviewed by three independent organisations (SGS Search, DSM and Milieu Centraal) and published in January 2020, beet sugar consumes significantly less water than cane sugar. Thus, little water is needed to produce sugar in the Netherlands (two litres per kg beet sugar) compared to Brazil (40 litres per kg cane sugar) and especially India (more than 1,000 litres per kg cane sugar).

The average global water footprint for sugar beet is 133 m3/t (with many European beet producing countries having a lower water footprint than the global average), compared to 209 m3/t for sugar cane and 1 222 m3/t for maize.[2]

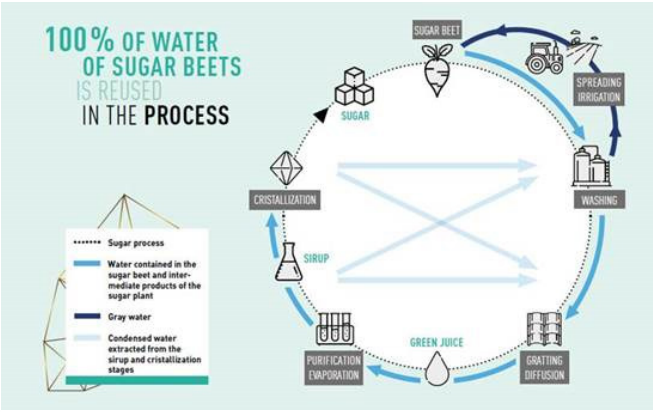


[1] The study refers to irrigated cane sugar. Full report is available here: https://www.cosunbeetcompany.com/news/beet-sugar-more-sustainable-than-cane-sugar/71

EU BEET SUGAR SUSTAINABILITY PARTNERSHIP

IN THE FACTORY

Sugar beet processing involves the use of water at various stages, including cleaning, heat transfer, cooling and beet movement within the factory. Within the factory, the beet itself – comprising 75% water – is by far the most important source of water. In fact, up to 90% of the water used during processing originates from the sugar beet itself. Therefore, sugar factories only need very limited supplies of fresh water, mainly for cooling, which comes primarily from ground or surface water, some managing to reach zero fresh groundwater uptake.



REDUCING IMPACT, IMPROVING PERFORMANCE

During the process, water contained in the beet is evaporated in order to crystalise sugar. Most of this steam is condensed to become liquid again and used in several phases of refining and production and is recycled several times in a closed system before discharge. The condensed water is also used in the beet cleaning process at the beginning of condensates is used to clean beet roots, thereby significantly reducing freshwater uptakes. After several recycling loops in the factory, the used water goes to wastewater treatment.

Excess water from beet washing is managed according to different systems adapted to local conditions:

- Land spreading either directly with beet soil during sugar campaigns in winter, or after decantation to contribute to irrigation during water shortage periods. This technique allows valorisation of water and nutrients in neighbouring agricultural plots and reduces the use of chemical fertilisers, as well as prevent soil erosion. Taking advantage of the nutrient content and the use of water in agriculture is recognised as a Best Available Technique for resource efficiency. [2]
- Discharge to water courses after efficient treatment systems ensures the lowest possible ill-effects. Organic loads (biological oxygen demand, or BOD) are reduced by more than 90% before effluents are returned to local water courses, according to Best Available Techniques for water treatment.

CASE STUDY 2: REDUCTION IN WATER CONSUMPTION IN THE SUGAR SECTOR

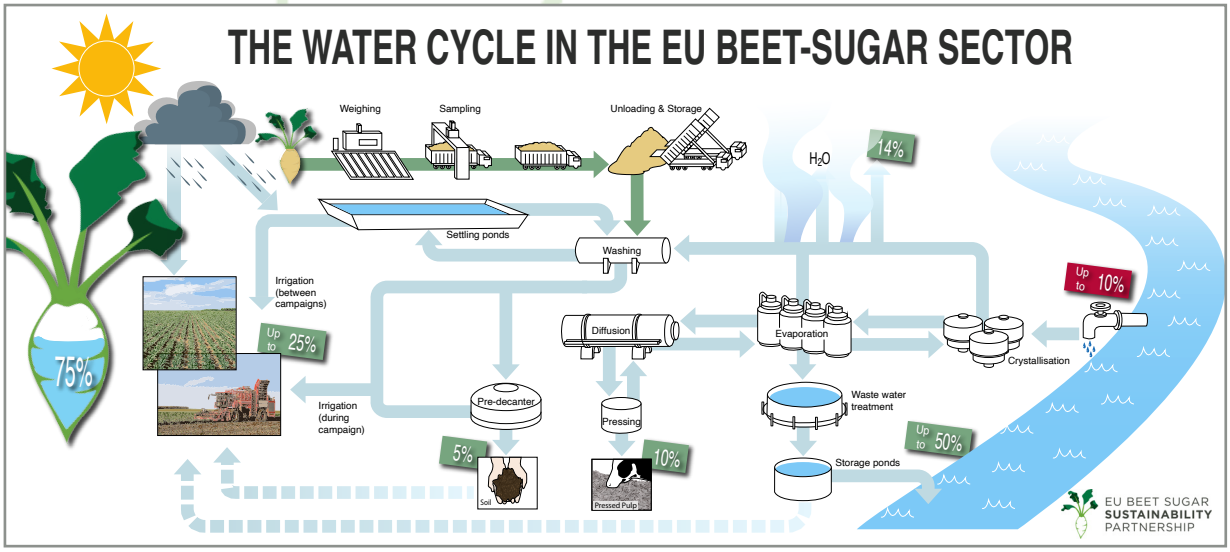
Several investment plans and renovation projects have been implemented by sugar companies to achieve the objective of reducing water consumption:

- **Creation of condensed water basins to recover beet water and to reuse it.**
- **Installation of agricultural spreading networks around sugar factories.**
- **Optimisation of industrial networks to use water recovered from beets.**

By optimising process consumption and by maximising the use of beet water, sugar plants aim to be water self-sufficient. At the end of the washing process, the nutrient-rich soil water is made available to the growers and used for spreading during the following beet season or decanted and used in the event of dry periods during the following year.

These inputs are taken into account by farmers, which further reduce the use of fossil fertilisers or water withdrawals.

For example, between 2010 and 2019, Cristal Union's water consumption was reduced by more than 47%.



[2] Commission implementing decision (EU) 2019/2031 of 12 November 2019 establishing best available techniques (BAT) conclusions for the food, drink and milk industries, under Directive 2010/75/EU of the European Parliament and of the Council.

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CASE STUDY 3: AZUCARERA DEVELOPS ACTIONS WITH AIMCRA

In Spain, Azucarera have already developed several actions with AIMCRA, the Azucarera's growers' technological institute. Among these actions are:

- **The water classroom programme, set up in order to communicate to the growers the main irrigation innovations, including energy efficiency and solar energy pumping and water saving tips.**
- **Satellite detection service, where thanks to both the satellite technology and the growers' historical consumption figures, growers can receive water assessment/management advice, while achieving money savings and improved quality of their crops.**
- **Solar irrigation promotion, already benefiting 500 growers who have substantially reduced energy costs and CO_2 emissions and improved water efficiency in their plots.**

WHAT'S NEXT

Water foot-printing methodologies are being developed to capture the total impact of a product on surface and groundwater, rainwater stored in soils, and on water pollution that occurs in production. EU BSSP members support these methodologies and actively promote their further rolling-out. Efforts to further improve water use efficiency continue, particularly in countries with a high level of irrigation.

MORE INFORMATION

See Good Practices

Part A – Cultivation:

2. Water
   - 2.1 Preventing run-off to watercourses
   - 2.2 Preventing nitrate leaching
   - 2.3 Efficient irrigation

Part B – Processing:

3. Water Efficiency & Protection
   - 3.1 Reduction of fresh water demand
   - 3.2 Preventing water pollution