

Paper's Water Footprint

The Facts

The European pulp and paper industry is aware of the importance of efficient and sustainable use of natural resources; including water. Most paper production takes place in locations with low water stress and, while large volumes of water are used, 90% of this is returned to the environment after extensive treatment.

Water is essential for society and the paper industry.

Water is essential for everyday life, yet 25 countries, home to over one-quarter of the world's population, face "extremely high" levels of baseline water stress, where irrigated agriculture, industries and municipalities withdraw more than 80% of their available supply on average every year.[1]

Water stress occurs when the demand for water exceeds the available amount during a certain period or when poor quality restricts its use. It occurs in areas with low rainfall and high population density or in areas where agricultural or industrial activities are intense.

The pulp and paper industry depends on water in three crucial areas.

- Firstly, there is rainwater that is essential for trees to grow, and, through photosynthesis, transform carbon dioxide to oxygen and cellulose; the latter provides the industry's primary raw material - wood fibre.
- Secondly, there is water that is used to make pulp and paper.
- Finally, there is the suitably treated effluent.

In the terminology of water footprint assessments, these three uses are sometimes referred to as 'green water', 'blue water' and 'grey water' respectively.

Forests need water but are essential for providing it too.

Rainwater is essential for forests and tree plantations to grow. Water security depends on forests. Forests help regulate the water cycle, sustain water supply and maintain water quality. Forested watersheds supply approximately 75% of accessible freshwater and provide water to over 85% of the world's largest cities.[2]

Forests contribute to landscape resilience and can reduce the impacts of natural disasters that can disrupt the source and supply of freshwater.[3]

Of course, forests will interact with the water cycle whether or not any of the wood is used for paper making. But there are sometimes concerns about the water uptake of trees when they are grown specifically to provide a crop of wood.

The area of forest designated primarily for soil and water protection is increasing. In Europe, an estimated 171 million ha of forest is designated primarily for the protection of soil and water, an increase of 95 million ha since 1990.[4]

Paper making is dependent on water yet relatively little is consumed.

Process water is essential for making pulp and paper because it allows the cellulose fibres to be refined, mixed, transported and ultimately bonded to form the sheet of paper. It is also vital in the form of steam for electricity generation and drying of the newly formed paper and cooling.

As water is a crucial resource for the industry, most pulp and paper mills are located near abundant supplies. In Europe, most mills utilise surface water, such as rivers and lakes (87% of intake), with some taken from own supplies of groundwater (12%) and the rest from public water supplies (1%). Since the 1990s, the average water intake per tonne has decreased by 42%.[5]

> *"In 2021, around 90% of the water used in the European paper industry was returned to its source (having been reused within the mill before being suitably treated), with the remainder either evaporated, staying within the product, or bound up in solid waste."*
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> Cepi, Key Statistics, 2022

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It is also important to recognise that intake does not equal consumption because most of the water will be returned to the environment.

Water leaving the mill is cleaner than ever.

Water is circulated within pulp and paper mills several times before it is returned. Before it is, it needs to be treated because it contains nutrients and organic matter. Various techniques are used, such as filtration, sedimentation, flotation and biological treatment.

Improvements in paper making techniques and water treatment have had a dramatic effect on the cleanliness of effluent leaving the mill. Since 1991, there has been a 79% reduction in AOX levels (a measure of the toxicity due to chlorine compounds) and a 78% reduction in COD (Chemical Oxygen Demand – how much oxygen is consumed by the decomposition of organic matter).[5]

Paper's water footprint is a lot lower than sometimes claimed.

There have been some claims that everyday paper products take excessive amounts of water to make. These assertions may not consider that 'green water' is needed for healthy forests, that mills are typically situated where there is abundant water and that much of it is returned.

The amount of water consumed by a mill will depend on the specifics of the production site, but 90% of the water is treated and returned to the source after being re-used several times within the paper and board mill.[5]

Sources

1. World Resources Institute, 2023
2. FAO, A guide to forest–water management, 2021
3. UN, WCMC, Exploring The Vital Role Of Our Forests, 2023
4. UN FAO, Global Forest Resources Assessment, 2020
5. Cepi, Key Statistics, 2022

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