Water availability in Belgium, a topic of concern



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At first sight, European regions appear to have abundant water resources as they are generally characterised by a temperate climate. Sustainable water practices do not necessarily come as a priority topic of interest as water availability is not commonly perceived as an issue. This is especially the case in a country such as Belgium often described as a rainy country. However, over the last few years, some elements such as the creation of a drought unit in Wallonia, the engagement of the Flemish government in a Blue

Deal and restrictions on water use during the summer in multiple Belgian municipalities have brought to the public attention the potential risks of a lack of water. So what is the situation of Belgium in terms of water availability? Should it be a topic of concern? This article intends to shed some light on these questions, with the scientific input of Marnik Vanclooster, Professor and researcher at the Earth of Life Institute at UCLouvain in hydrology and water management, for a better understanding of the Belgian water context.

Water scarcity and drought: European and Belgian contexts

Water scarcity usually happens in areas with low rainfall (EEA, 2020). It is defined by the European Commission (EC) as the "insufficiency of water resources to satisfy long-term average requirements" (EC, n.d.). It addresses the long-term water imbalances resulting from the combination of "low water availability with a level of water demand exceeding the supply capacity of the natural system" (EC, n.d.). Droughts, on the other hand, are the temporary lower water availability and can occur anywhere in Europe and in any season, even if regions with low water resources or where water resources are not properly managed experience an even bigger impact from droughts.

Drought events have been increasing over the last thirty years in Europe in terms of frequency and impact (EC, n.d.). This has been especially the case in Southern regions, but the phenomenon spreads now to Northern regions too, including Belgium. Seasonal water shortages have been occurring more often and are expected to keep on increasing in the future. As a consequence, it is not only low rainfall which defines the risk of water scarcity anymore, and sustainable water practices in Belgium become important not only to address the seasonal water shortages but also as lower levels of water tables can be observed (Maes et al., 2020).

Why is Belgium affected by water shortages? What can we expect for the future?

One might find it paradoxical to address topics such as water scarcity and drought issues in the Belgian context as Belgium is commonly perceived as a cloudy and rainy country. However, Professor Vanclooster explains that "although Belgium is situated in a moderate climate region, it is subjected to significant water scarcity risk. This is due to multiple factors which, together, are expected to lead to very critical situations in the nearby future".

A first factor highlighted by the Professor is the **high degree of impermeabilisation of soils**. Belgium is a densely populated country, and the urbanisation increases the soil sealing. Groundwater expert Marijke Huysmans indicates that the vegetation cover is progressively replaced by concrete and asphalt (Universiteit van Vlaanderen, 2020) which prevent water from infiltrating the soil and being retained in the subsurface of groundwater systems.
Mr. Vanclooster also underlines that "*a significant share of the total amount of precipitation water is poorly retained and drains fast through the river network to the North Sea". He adds further that "the design rules for hydraulic and drainage infrastructure that were used after the Second World War mainly aimed to evacuate water fast from the inland, thereby increasing the potential of drained land for agriculture, industry and urbanisation projects. The design rules for hydraulic infrastructure also aimed at promoting the potential of the waterways for navigation and economic development. All this resulted in the fact that too little room was given to water in the past land management plans, and that water retention in the inland is low.*"
A second factor is **high water demand**. Population growth and high population density in Belgium are elements with a significant impact on water demand both in the past and the coming decades. Further, according to Professor Vanclooster, the "*water footprint of Belgium is also very high as a consequence of the consumption pattern for water by the Belgian economy, by the different sectors and citizens, directly or indirectly, which is high and exceeds the amount of renewable resources*". Indeed, there is an intensive industrial activity which has relatively high levels of water exploitation compared to renewable freshwater availability as illustrated in the Water Exploitation Index Plus developed by the European Environment Agency.
Third, **the impact of climate change** on water availability is often studied in scientific literature and Professor Vanclooster points out that "*climate change is also impacting the climate in Belgium. Although winter rainfall increased over the past twentieth century, there is no significant observed trend in spring and summer rainfall. Yet, most reference climate models project that climate change will increase seasonality in precipitations*". A study by Tabari, Taye and Willems (2015) found that indeed drier summers

and wetter winters are to be expected by the end of the century. This increases the risk of floods in winter and causes more frequent and persistent drought events in summer, putting a strain on water supplies (EEA, 2018). This is illustrated by "*the past five years which were marked by heat waves (the last one took place not even one year ago, from the 5th to the 16th of August 2020), with record temperatures, and many periods of below average rainfall*", as reminded by the Professor at UCLouvain.
All in all, these different factors explain why Belgium, and especially Flanders due to its even higher population density and its geological and topographic characteristics, has relatively little water availability (Tabari, Taye and Willems, 2015), and the growing exposure of Belgium to increasing resurgence of drought events and water scarcity risk in the future.

Resulting challenges and policy implementation

As described in the report "Risque de raréfaction des ressources en eau" elaborated collaboratively by the IWEPS and the SPW Environnement – DEMNA (Maes et al., 2020), the challenges and consequences resulting from water shortages in Belgium are manifold. It goes from an environmental aspect (degradation of water quality, threats to biodiversity, etc.) to a socio-economic dimension (impact of droughts on agriculture, sylviculture, drinking water production; impact of low water base flow on electricity production, transport, etc.) and political and geopolitical concerns (resource sharing, climate adaptation and action, etc.).
In terms of policy, water has increased on the political agenda to address this issue. On a European level, the EU Water Framework Directive (WFD) was launched in 2000 and is regularly complemented by more specific EU laws in order to establish an approach to address water scarcity and drought in the EU. In 2012, the "Blueprint to Safeguard Europe's Water Resources" was issued as the water milestone of the 2011 Resource Efficiency EU Roadmap in order to drive EU water policy over the long term. In Belgium, regional water management plans in Brussels, Flanders and Wallonia have been implemented following the obligation resulting from the EU WFD, and are constantly reviewed and completed. "*Different measures in these water management plans are proposed to reach a good ecological status for the different surface and groundwater bodies*" confirms Professor Vanclooster. Yet, notwithstanding this, he calls attention to the "*need for additional measures as the recent droughts of the past five years elucidated*

that the exposure and vulnerability to drought of different sectors in Belgian remains very high. Also, the increasing number of exceptional rainfall events continues to put pressure on the current hydraulic infrastructure, creating often unwanted flooding. Therefore, more effort needs to be dedicated to integrated and sustainable water policies. In that perspective, the Blue Deal launched in 2020 by the Flemish government is a good example of how water policies can be strengthened to face the multiple water-related challenges".

Research and technology development also address water-related issues and the fight against droughts and flood events in different ways. Analyses and projections are made by researchers notably on water availability, water quality and the impact of climate change to provide policymakers with the right information and tools for decision making. However, there is still additional research and development in the water sector needed as Marnik Vanclooster explains that "*the uncertainty on the current and future availability of water resources remains high. With new SMART technologies, more rigorous and precise diagnostics of the water system could be made allowing for a more precise and locally adapted water management. With more advanced models, based on big water data inferred from the internet of things in the water sectors, better and precise predictions can be made on the evolution of the water resources, allowing for more specific water management in different sectors*".

In the meantime, private initiatives are also emerging to tackle water-related issues and technologies, such as the one developed by Shayp, offer concrete opportunities for more sustainable water management, in the building sector in that case. The increasing number and intensity of droughts will not be avoided in the 21st century, given the impact of climate change. All efforts count, in a combination with public and private, and global and local initiatives, as well as awareness-raising and behaviour transition in terms of water use.

About Shayp

Shayp is a Belgian technology company specialised in the analysis of water consumption and early leak detection. It helps property owners and managers save an average of 20% on their water bill thanks to a unique, non-invasive and easy-to-use water monitoring technology labeled by the Solar Impulse Foundation.

Since its creation in October 2017, Shayp's solution has achieved outstanding results with public and private organisations (cities, municipalities, hospitals, schools, apartment complexes, insurers, etc.), helping them save hundreds of millions of liters of water yearly

and significantly reduce their water bill with optimised maintenance.

Recognised as the Belgian startup of the year by the Belfius Smart Belgium Awards in 2018, awarded with the Seal of Excellence of the European Commission and one of the eight global best startups in the Zurich Innovation World Championship, Shayp combines innovation, simplicity and ecology in its unique solution, and thus wish to contribute to a conscious use and behavior of water and more resilient and sustainable buildings.

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