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Revealing the role of Nature-based Solutions as drought adaptation strategies

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Climate change has caused an increase in the frequency of hydrometeorological extremes world-wide, opening new challenges for decision makers and stakeholders in managing and regulating water. Among the adaptation strategies available, Nature-based Solutions (NBSs) gained increasing attention in recent years, because of their efficiency in reducing hydrometeorological risks while also providing additional benefits for biodiversity, landscape and society. Despite the ever-increasing interest for NBSs, many stakeholders still doubt their potential, as the quantitative effects of NBSs over long periods of time are still to be assessed.

In this research, we show how several types of NBSs, such as wetlands restoration, infiltration ponds, ditch blocking and others, can be used to adapt to drought conditions under the future climate projections. We use as a pilot case the transboundary Aa of Weerijds catchment, shared between Belgium and the Netherlands, which recently became drought-prone. We develop a fully distributed coupled MIKE SHE-MIKE 11 model to mimic the hydrological behaviour of the catchment in present (2010-2019) and future climate conditions (2050-2059, scenario KNMI '23). The same hydrological model is then used to test the effectiveness of different drought adaptation measures, based on single type or combinations of NBSs. To quantify the impacts of the chosen strategies to adapt to drought conditions and in consultation with some local stakeholders, we define a set of Key Performance Indicators (KPIs) that provide tangible results for stakeholders and decision makers. Finally, we show the results of the different adaptation strategies implemented on a web-app, which can be accessed and used by decision makers and stakeholders as an aid tool to select the best adaption strategy.

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