GREENADAPT2EXTREMES

Green adaptation pathways for resilient basin futures under increasing extreme floods and droughts

Abstract

In Europe, the frequency and severity of flood and drought events, together with their negative impacts on society and ecosystems, have increased over recent decades, and this trend is projected to continue in the future. Risks connected to extreme floods and drought present a high level of complexity and interconnectedness, posing a challenge to risk management. While efforts are in place to achieve sustainable management of water-related risks, the scale of recent catastrophic events shows that new approaches and methodologies are needed to manage hydroclimatic risks both in the short and long-term.

Nature-based solutions (NbS) offer an important strategy to achieve water-secure, climate-resilient societies and promote nature conservation. However, while NbS are potentially viable risk reduction and adaptation strategies for both flood and drought risks, knowledge gaps remain about their potential and limits under extreme floods and droughts as well as regarding their cost-effectiveness, co-benefits and trade-offs. A thorough understanding of how NbS can contribute to the effective management of dynamic multi-risks linked to extreme droughts and floods under changing climate conditions is paramount.
Tributary catchments, often overlooked in favour of large riverine systems, offer much potential to develop innovative and sustainable solutions: while they also experience catastrophic impacts, they are often less regulated compared to larger rivers. In such settings, adaptation decisions can benefit both upstream or local communities and downstream areas and communities.

Taking up these challenges and opportunities, the "Green adaptation pathways for resilient basin futures under increasing extreme floods and droughts" (GreenAdapt2Extremes) project aims at co-creating transformative adaptation pathways based on NbS. It will focus on the catchments of three highly flood and drought-prone tributary rivers: the Dora Baltea (Italy), the Geul (Netherlands) and the Erft (Germany). Importantly, the project will center on the involvement of stakeholders in all activities, beginning with the co-creation of "visions for resilient basin futures", where stakeholders will be able to express their ambitions, needs, values and preferences for desirable future(s). These will form the basis for every subsequent activity of the project.

Green adaptation pathways will be co-created with stakeholders in a transdisciplinary setting at the catchment scale, building on an analysis of:

- I. current and future drought and flood risks, and
- II. the co-benefits, potential, limits and social acceptability of NbS.

The pathways will also be informed by our analysis of suitable multi-level governance of risks and adaptation. The future decision space mapped through the green adaptation pathways will help improve the protection from floods and droughts for people, ecosystems and economic sectors. A participatory, mixed-methods approach (supported by existing information and local knowledge) will be adapted to the specific conditions of each case catchment.

Planned dissemination and international networking activities will facilitate knowledge transfer and cross-boundary learning, but also support the evaluation of the transferability and upscaling potential of the project's approach, methods and solutions.

In doing so, GreenAdapt2Extremes is relevant to multiple of the call's topics and themes, notably "Topic 1: Resilience, adaptation and mitigation to hydroclimatic extreme events" (sub-topics 1.1 & 1.2), "Topic 2: Tools for water management - in the context of hydroclimatic extreme events" (sub-topic 2.1), and "Topic 3: Improved water governance in the context hydroclimatic extreme events and international contexts" (sub-topics 3.1 and 3.2). Further, it directly contributes to Theme III "Water for the future: sustainable water management" and Theme VII "Governance".

Project coordinator: **Michael HAGENLOCHER**

UNITED NATIONS UNIVERSITY, INSTITUTE FOR ENVIRONMENT AND HUMAN SECURITY (UNU-EHS) - GERMANY

Project partners

- CIMA RESEARCH FOUNDATION – ITALY
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Contact

Michael HAGENLOCHER
hagenlocher@ehs.unu.edu

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