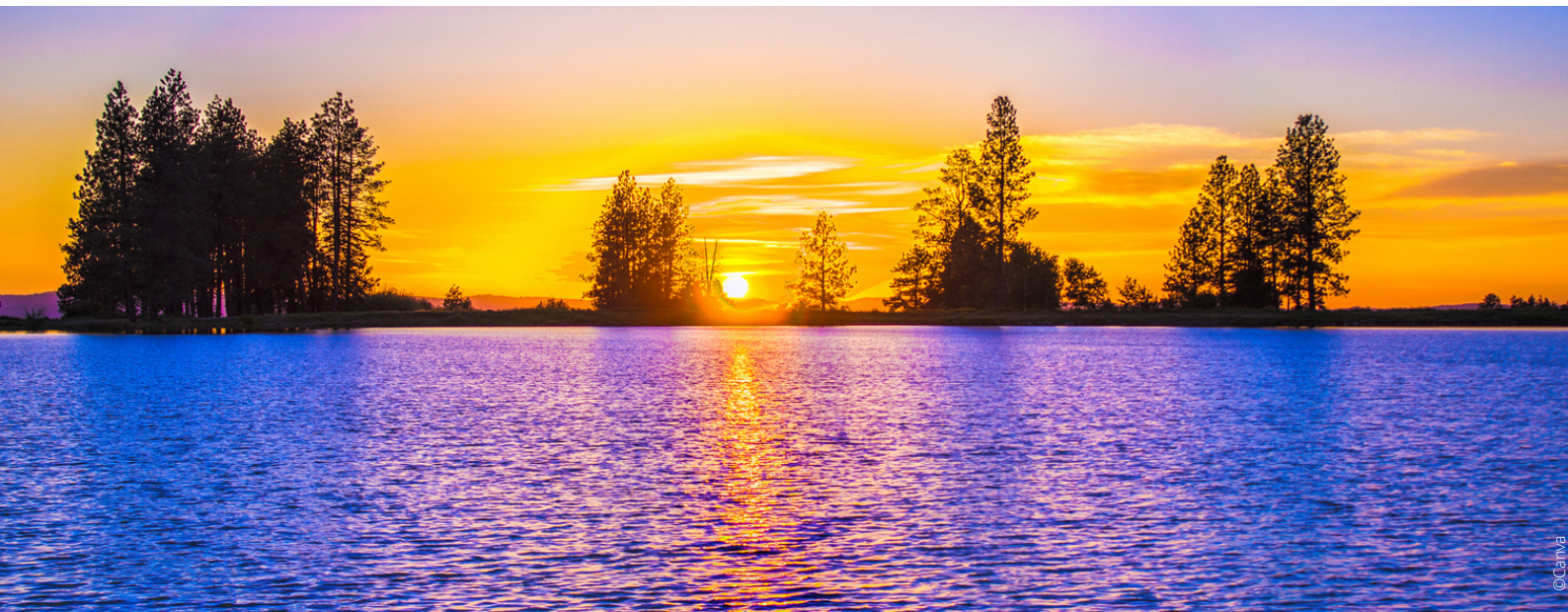


EURAQUA NEWSLETTER

European Network of Freshwater Research Organisations



Message from the Chair



Dear EurAqua members and stakeholders,

At the end of February, European landscape of peace and security changed fundamentally. News of the corona pandemic melted into the overwhelming catastrophe of the Russian attack and the war in Ukraine. Concurrently, the global crisis of climate change is ticking and require international, national and local solutions, actions, and decisions. [The IPCC report on Impacts, Adaptation and Vulnerability \(WGII\)](#) presented recently a solid conclusions of the urgency of adapting to climate change, ensuring water security, and combating biodiversity loss. The window of opportunity for adaptation is closing and thus the actions are needed urgently.

European energy and fertilizer dependency of Russia has also lifted the linkages between water-energy-food-environment - and security - nexus on the table. It is necessary to strengthen sustainability and accelerate the energy and food transition as a part of the green transition. Water is entangled in these questions.

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SUSTAINABILITYLEAP.FI IS A SHOWCASE AND SHARING PLATFORM FOR FINLAND'S CLIMATE, CIRCULAR ECONOMY AND NATURE SOLUTIONS

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EURAQUA MONITORING WEBINAR ON 25TH OF MARCH 2022



Supporting Stakeholders for Adaptive, Resilient and Sustainable Water Management, (STARS4Water)

Worldwide freshwater resources are under increasing pressures of rapidly intensifying climate change effects putting the availability and quality of water resources and socio-economic developments at risk. River basin organizations need to be prepared.

Scientific community needs to bring ideas and show way forward, although there are no quick solutions towards sustainability transformation. The freshwater research organisations provide information to enhance sustainable water resources management, while considering the different users and needs, and aiming to deliver solutions for renewal and restoration of inland waters and their ecosystems and biodiversity.

In the world of disputes, shared waters could also unite. Joint water management is an opportunity to enhance collaboration and participation and relief conflicts. Along this topic, in the World Water Day on 22 March 2022 at [the 9th World Water Forum](#) in Dakar, Senegal, Finland, Slovenia and Switzerland organized jointly an event “Accelerating cooperation on transboundary waters with water diplomacy: perspectives and tools”.

The STARS4Water proposal submitted to the EC has been selected for [Horizon2020 CL6](#) funding and is currently in contract negotiation. The project is intended to start on 1 October 2022 and runs for 4 years.

The project aims at improving the understanding of climate change impacts on water resources availability and the vulnerabilities for ecosystems, society and economic sectors at river basin scale. The project will develop and deliver new data services and data driven models for better supporting the decision making on planning on actions for adaptive, resilient and sustainable management of fresh water resources.

Sincerely

Anna-Stiina Heiskanen,
Chair of EurAqua

director, professor
Freshwater Centre
Finnish Environment
Institute (SYKE)

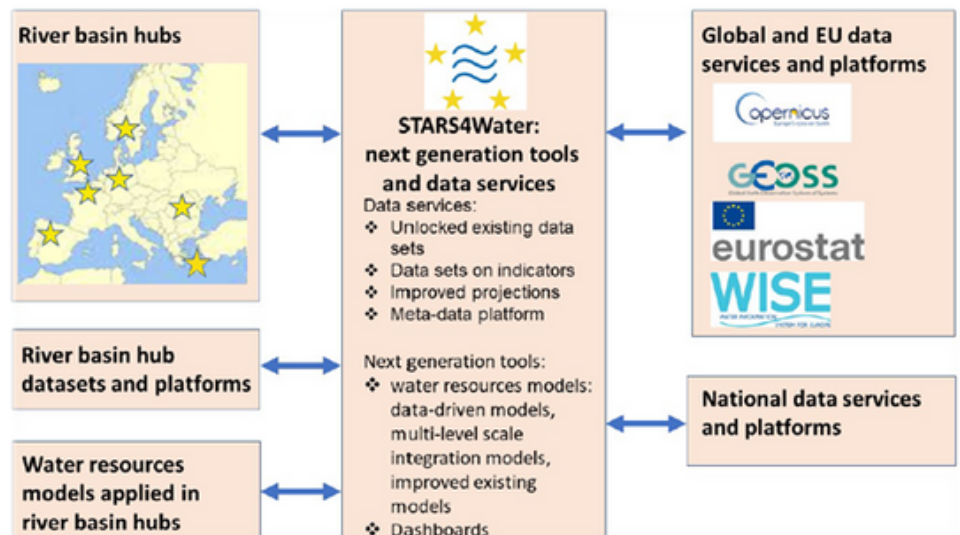


Fig. 1. STARS4Water project map.

The STARS4Water project includes two distinctive elements. First, the project team will work with seven river basin organizations through a co-creation, living lab approach. The new services and models will be co-designed with stakeholders to meet their needs on data and information, ensuring relevance and uptake for use beyond the lifetime of the project. Second, the team will advance the use of new datasets and models and integrated these in current river basin management information tools and decision-making processes. New datasets and models offer possibilities for improved projections on water resources availability, and the new insights on links between water, nature, society ask for a broader set of indicators to be considered in decision-making on water management.

We acknowledge that these elements are of a different nature, being a stakeholder-driven approach and rather science-(data-)driven in the application of novel data and models, respectively. It is the consortium's firm conviction that for substantial progress in climate change adaptation with respect to water resources management the two elements need to be combined.

Project management and consortium

Deltares leads the consortium, that consists of research organisations, small and medium enterprises and river basin organizations and brings together expertise in data science, software development, water resources management, river basin hydrology, ecological flows and water use by economic sectors.

The consortiums comprises 21 partners, nine of which play pivotal a role in the seven case studies (8 River Basin organisations 11 academic and research institutes and 2 enterprises).

For more information:

- Harm Duel (harm.duel@deltares.nl) and Judith ter Maat (judith.termaat@deltares.nl).

BIOWATER - Iron in boreal streams

BIOWATER (2017-2022) is a Nordic Centre of Excellence, with a main goal to examine the impacts of the bioeconomy on land use and freshwater quality and quantity. We are eight institutes in four countries (Denmark, Finland, Norway and Sweden), and with three European collaborating partners.

Through co-operation between stakeholders, scientists and students, BIOWATER explores how the green shift will influence land use, water quality and quantity. We aim to provide management solutions in the face of potentially competing demands for biomass, land and water resources.

Main objective is to quantify the combined effects of land use change, climate change and industrial innovation due to the green shift, for catchment-scale carbon, nutrient and water cycles, as well as major ecosystem services (including good ecological status of fresh waters).

An in-depth look at iron in boreal streams

In boreal catchments, **iron** has a key role in biogeochemical and ecological contexts, and at the same time has many harmful impacts on aquatic organisms and ecosystems. Recent studies indicate that iron concentrations are increasing in boreal freshwaters, with the potential negative effects this can have on water ecology.



Fig. 2. Iron rich water is surfacing from a spring the catchment of River Kiiminkijoki. ©Markus Saari



Finnish researchers have now explored the many aspects of iron in boreal waters, in a paper that will be published in 2022 in the journal *Science of the Total Environment*. The researchers have looked at this topic in a broad way, including perspectives of biogeochemistry, hydrology, ecology, and river basin management.

The authors express that land use management in boreal catchments should take into account the harmful effects of iron. Typical iron storage sites are peatlands, other wetlands and naturally moist areas, groundwater seepage areas and springs, stagnant water areas, and riparian zones, and the authors stress that activities in such areas are likely to contribute to higher levels of iron mobilization in downstream water bodies.

Based on their survey, they advice that water protection and management programs should aim to (i) prevent iron mobilization from soil layers by avoiding unnecessary land-use activities and minimizing soil disturbance in high-risk areas; (ii) disconnect iron-rich ground water discharge from directly reaching watercourses; and (iii) decrease transport of iron to watercourses by applying efficient water pollution control approaches. These approaches may require specific methods that should be given attention depending on catchment conditions.

Moreover, the researchers highlight the needs for additional research on boreal catchments. A key issue is to increase the understanding of the role of iron in the utilization of organic material in riverine food webs, which are typically highly heterotrophic. More knowledge is needed on the metabolic and behavioral resistance mechanisms that aquatic organisms, such as algae, invertebrates, and fish, have developed to counter the harmful impacts of iron in rivers with naturally high concentrations of both iron and organic matter.

It is also emphasized that to fulfil the needs presented above, as well as to develop effective methods for decreasing the harmful impacts of iron in water management, the biogeochemical processes contributing to Fe transport from catchments via rivers to estuaries should be better understood.

The study including further scientific insights regarding the studies is available via the following links:

- [BIOWATER project page](#)
- Iron in boreal river catchments: Biogeochemical, ecological and management implications. [Sci. Tot. Environ. 805](#)



Fig. 4. Catchment area of rural area in Finland ©Kai Widell

Collecting nutrient data on individual field parcels into a digital data system would significantly enhance the efficiency of water protection in agriculture

A reform of environmental regulation of agriculture is currently under way. Maximum levels are being set for phosphorus-based fertilisers, and they will be applicable to all farms. Enforcement of the restrictions needs to be made easier than it is now. According to a new report, the best way to succeed at this would be to introduce a digital data system that would compile data on nutrients, cultivation, and crop yields from all field parcels in Finland. Establishing such a nutrient data resource would require new legislation.

Solving the problem of agricultural eutrophication requires efficient environmental regulation of agriculture. This regulation is currently being updated. Existing restrictions on the use of nitrogen fertilizer will be supplemented by regulations on maximum levels of phosphorus application that will apply to all farmers.

To support fertiliser regulation, the new report proposes the establishment of a digital nutrient data resource that would be available to officials and researchers.

The report is a cooperative effort of the Finnish Environment Institute (SYKE) and the Natural Resources Institute Finland (Luke). “Farmers certainly know the nutrient status of their own fields, but information from farms is not being passed on for use by administrative bodies or researchers. This means that restrictions on fertilizers and other environmental policy matters ends up being planned and implemented based on inadequate information”, notes Luke researcher Kauko Koikkalainen.

The digital nutrient data resource would bring information on nutrients, cultivation, and weather from all field parcels in Finland. The data resource would be maintained by the Finnish Food Authority.

“Setting up the data resource would require greater reliability in the taking of soil samples for fertility analysis. The existing administrative registers also need to be developed. For example, the Plant Registry should be standardised, and a real-time fertiliser register should be established”, Koikkalainen adds.

The data resource would help in the planning of environmental policy and the development of agricultural water protection measures as cost-effectively as possible.

On some farms setting up a nutrient data resource would require further action

The initiation of an agricultural nutrient data resource would require further action on farms that are not yet recording notes on individual field parcels as extensively as existing environmental compensation would require. Further measures would also be in store for farms where field parcel notes are not yet recorded digitally. On the other hand, the need for separate surveys and reports that farms need to complete would decrease.

“Interviews with farmers show that there is a diversity of attitudes, both negative and positive, toward collecting and using parcel-specific nutrient information. Some of the farmers that were interviewed suspected that not all farmers comply with the limits placed on fertiliser use. In such cases the nutrient data resource can be seen as an opportunity to ensure that the same rules apply to everyone”, explains Helena Valve, Senior Research Scientist at SYKE.

Establishing a nutrient data resource requires new legislation

Establishing a nutrient data resource would require new legislation. All farmers would be required to maintain, and to report to officials about the field parcel records that they keep at a level equivalent to the present environmental compensation system in a way that makes it possible to monitor maximum levels of fertilisation.

Although the nutrient data resource would be primarily intended for use by officials, the information that it contains would mainly be public environmental data with no basis for restrictions on availability. However, sharing the information would require either a separate amendment to the Act on the Openness of Government Activities, or inclusion of the regulations on environmental information in the nutrient information reserve in special legislation on the limiting of nutrient loading.

The report is part of the Shared Waters project run by the Finnish Environment institute. The aim of the project is to develop concrete recommendations to improve the knowledge base and methods of water protection. Funding for the project is provided by the Finnish Cultural Foundation and it includes researchers from the Finnish Environment Institute, the Natural Resources Institute Finland, the University of Helsinki, and the Pyhäjärvi Institute.

For more information:

- Kauko Koikkalainen, firstname.lastname@luke.fi
- Helena Valve (farmer interviews), firstname.lastname@syke.fi
- Jussi Kauppila (legal analysis) firstname.lastname@gov.fi
- Petri Ekholm, head of the Shared Waters project, firstname.lastname@syke.fi
- Report: [Agricultural nutrient data resource – a tool for officials and farmers](#) (helda.fi) (In Finnish with English abstract)
- Link to the pages of the [Shared Waters project](#)



Sustainabilityleap.fi is a showcase and sharing platform for Finland's climate, circular economy and nature solutions

Sustainability Leap is an online platform provided and maintained by the Finnish Environment Institute to present and disseminate climate, circular economy and nature solutions.

The purpose of the service is to gather progressive practices into a single service to present the benefits of actions and enable their replication.

In addition, a common online platform is cost-effective, as different actors do not have to use resources to build and maintain their own reference services.

The service is open, permanent and free for all actors: municipalities, companies, organizations, residents, parishes, research projects, etc.

“We want to highlight effective actions that clearly contribute to climate change mitigation, circular economy and halting the loss of biodiversity. The best examples show not only successes, but also obstacles and how to overcome them. Particularly interesting are the numerically calculated benefits and cost impacts of an action”, says Ulla Ala-Ketola, Editor-in-Chief of the online service at the Finnish Environment Institute.

Finnish Environment Institute SYKE checks the actions before publishing them. The service is published in Finnish and English. SYKE is ready to open the user interface in Swedish, if different parties are prepared to produce content for the service. For more information contact Ulla Ala-Ketola (firstname.lastname@syke.fi)

SMARTer Greener Cities: Making Smart Cities Smarter and More Liveable Through Nature-based Solutions

To be inclusive, equitable, resilient and fulfil their role as drivers of sustainability transformation, cities and towns need to be designed and governed as socioecological-technical systems (SETS). This entails cutting across silos in disciplines and approaches by bringing technology, people, and nature together. Planning, designing, and managing urban spaces require a deeper understanding of how social, ecological and technological interact and the consequences of these relationships on biodiversity and human well-being.

The SMARTer Greener Cities project (2020- 2023) aims to develop and test novel tools and processes for explicitly converging social, ecological, and technological systems (SETS) approaches for improving life in cities.

The first policy brief of the SMARTer Greener Cities has now been launched. There we propose recommendations for urban planners and researchers based on our research on how technology and nature can promote multisensory experiences and psychological restoration in two residential areas in Helsinki, Finland.

Within three case cities we analyse SETS couplings (Fig. 6). This is a first policy brief presenting the main findings of WP3 with some recommendations for urban planning and governance.

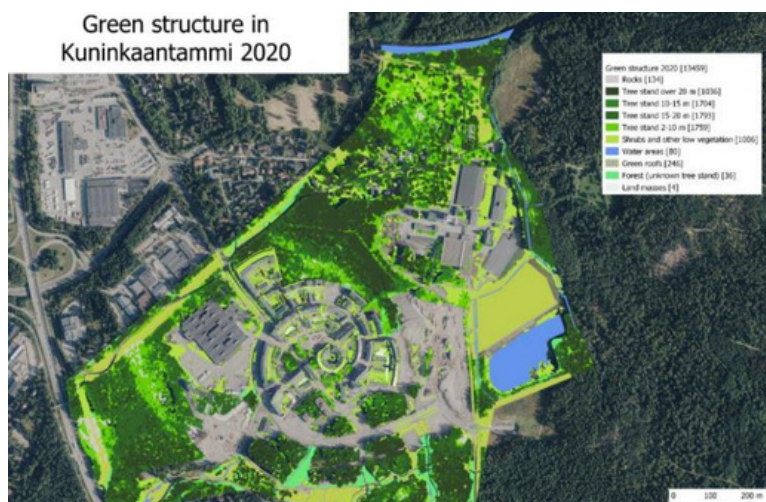


Fig 5. Green structure in Kuninkaantammi 2020 ©Elina Nyberg

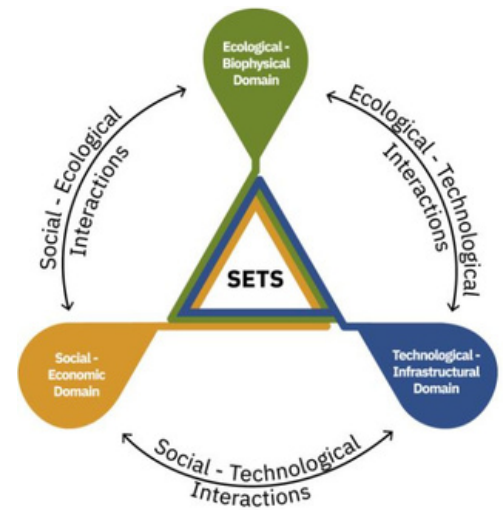


Fig 6. SETS approach was used in SMARTer ©Source McPhearson et al 2021.

Recommendations for cities

- Be smart and green with your plans
- It's not just noise but also the sound of life
- Restorative and valued places are not just visual but multi-sensorial phenomena

Smart and Green solutions can offer inclusive and equal opportunities to support human wellbeing and sense of identity in growing areas. Clusters of different values (e.g., restorative view, recreation, aesthetic) in walking distance from homes make daily living environments amenable to different experiences and thus attractive and restorative to residents. Urban soundscapes are much more than just noise and a source of discomfort (e.g., through noise maps) disregarding the possibility of positive sound experiences. Spatially mapping soundscapes and combining these with information on other landscape values as well as different activities, preferences and perceptions of the people engaged in them provides a more nuanced approach to assessing the well-being benefits of nature-based solutions and smart technologies.

For more information:

- Project coordinator: Erik Andersson, Stockholm University, erik.andersson@su.se
- Helsinki case contacts: Christopher Raymond, University of Helsinki, christopher.raymond@helsinki.fi and Kati Vierikko, Finnish Environment Institute (SYKE), kati.vierikko@syke.fi
- Read more about the project:

<https://smartergreencities.com/>



Hydro-RDI-Network aims to build a Finnish competence center for hydrological research and innovation

Hydro-RDI-Network is a project consortium of Finnish research organisations and companies jointly taking an action to boost RDI activities related to hydrology, It aims to support and promote the networking of higher education institutions, government research institutes and the business sector in order to boost the societal impact of high-quality research in Finland.

Coordinating partners Hydro-RDI-Network are University of Turku/Department of Geography and Geology, Finnish Environment Institute, Finnish Geospatial Research Institute (FGI) in the National Land Survey of Finland, University of Eastern Finland, and University of Oulu.

The research of the network aims to improve and implement river and catchment measurement, as well as mapping and modelling approaches developed in previous research projects by applying a wide variety of methods in development of service packages in relation to flood risk, dam safety, river habitats, water quality and sustainable river management.

The activities include:

- engaging the private sector in identifying relevant collaboration and business opportunities, and in framing future possibilities to find sustainable ways to accommodate future stressors towards water courses and foreseen climate change.
- analyzing the water and environmental impacts and opportunities nationally by utilizing the latest scientific tools, approaches and technological advances jointly in close collaboration with the private sector.
- providing a consortium reaching out to serve different national stakeholders by supporting an understanding of riverine and catchment processes, river restoration impacts and flood risk management, their enhanced uses and future development including blue bioeconomy.
- developing new working methods and other transfers of knowledge in order to establish a basis for future collaboration. This increases the qualifications of academia and Finnish companies for the international call for tenders and identifying eligible international call for tenders in the water sector.
- offering new technologies to resolve problems arising from human impacts on hydrological systems.
- drawing on existing research excellence across Europe and providing access to a range of Finnish hydrological systems, facilities and expertise.

For more information:

- Professor Petteri Alho, University of Turku, Finland
- Professor Cintia Uvo, Finnish Environment Institute, Finland



Handbook on Water Allocation in a Transboundary Context

The water resource managers of the countries sharing transboundary rivers or lakes are posing following questions: Which users may use the water of a lake, river or other source? For what purposes, in what quantity and of what quality? Where and when?

These are the questions answered by 'water allocation' which is the process and/or outcome of determining how different stakeholders use water. With growing water scarcity around the globe, determining such water use presents a major challenge - and even more so in transboundary basins where (potentially conflicting) interests of different water users overlap with (potentially conflicting) interests of different countries. And while allocating water in transboundary basins is not a new practice, the looming water crisis, accelerated social, economic and technological developments, and climate variability call for new, flexible approaches that can future-proof water management.

Over a period of 3 years, more than 100 countries, 70 international organizations, 20 river basin organizations were involved in the Handbook's development. A group comprising over 50 experts in this field met regularly and systematically analysed existing experiences on transboundary water allocation at the global level. They distilled criteria, good practices and solutions to deal with growing water scarcity around the globe.

They learned from each other and improved their understanding of the benefits and challenges of utilizing water allocation in transboundary water cooperation.

The result: The first-ever '[Handbook on Water Allocation in a Transboundary Context](#)' explains the various phases, benefits and challenges of transboundary water allocation and guides interested States through the process of assessing its potential usefulness in their shared basins. The Handbook contains 46 exemplar case studies highlighting key features of allocation and demonstrating their practical application in different transboundary water contexts around the world. It also helps build the capacity needed to address complex issues of water allocation, supports governments in establishing water allocation arrangements and, as such, sends a strong message on the importance, and feasibility, of transboundary cooperation and of adaptability. Last but not least, the Handbook presents the first-ever overview of water allocation agreements in transboundary waters.

The drafting group handbook was lead by the Prof Antti Belinskij from the University of Eastern Finland, with colleagues from the Finnish Environment Institute and the Aalto University.

For more information:

- [Handbook on Water Allocation in a Transboundary Context](#)
- Professor Antti Belinskij from the University of Eastern Finland



Water Cooperation and Peace - Finnish Water Way

Together with its partners, Finland works to prevent and resolve water-related conflicts in a world of climate change and resource scarcity. Finland assists in finding solutions to challenges that risk aggravating relations over water. In this Finland brings together two international areas of expertise - peace mediation and water know-how.

Water diplomacy refers to the prevention and resolution of political tensions over water and its use by drawing on water expertise and diplomatic tools. The vision of Finland's international water strategy and the ultimate goal of Finnish water diplomacy efforts is a water secure world. Fair and well-governed management of water resources serves as a platform for cooperation and peacebuilding. Water can act as the starting point for preventive and proactive peace mediation.

The Finnish approach to water diplomacy combines two of Finland's strengths, transboundary water cooperation and peace mediation, and builds on national and international networks and partnerships.

"Working together towards a water secure world"

The Finnish Water Diplomacy Network consists of experts from ministries, academia and research institutions, non-governmental organisations, and the private sector. The network-based implementation of Finnish water diplomacy activities ensures engagement of relevant peace mediation and water actors and enables utilization of their expertise for both rapid response and longer-term development aims.

Internationally, Finland collaborates with state and non-state actors in developing activities related to water diplomacy. These activities enhance conflict analyses and mediation, joint initiatives, and capacity building, all of which strengthen conflict prevention.

[The 9th World Water Forum](#) will be held in Dakar, Senegal, March 21-26, 2022. Finland is represented by a delegation from three ministries (Ministry of Foreign Affairs, Ministry of Foreign Affairs and Ministry of Foreign Affairs).

[On World Water Day 22.3, Finland, together with Senegal, Slovenia and Switzerland, will organize a joint event at the Water Forum as part of the UNECE Transboundary Pavilion.](#) The event will discuss and exchange experiences on the possibilities of water diplomacy as part of transboundary cooperation. More information in the event brochure below and on the UNECE website.

For more information:

- [Brochure: Water Cooperation and Peace - Finnish Water Way](#)
- Sara Todorovic and Tea Törnroos, Finnish Environment Institute SYKE, firstname.lastname@syke.fi



Emerging monitoring technologies and capabilities for water - webinar on March 25th 2022

Welcome to EurAqua Webinar on 25th March 2022 at 10.30-13 CET about "Emerging monitoring technologies and capabilities for water". Warm welcome!

The general approach of the webinar is to promote an open exchange of emerging solutions, knowledge, practice and know-how of water monitoring technology and capabilities for water management, water quality and measure's effectivity.

More information:

- [Program](#) (pdf)
- [Event page and sign-up](#)

Don't miss out

International seminar on Soil and Water Conservation on 4 - 6 May

I.S. Rivers Conference on 4 - 8 July 2022
Nordic Stakeholder conference on

International Interdisciplinary Conference on "Land Use and Water Quality"- Agriculture and the Environment on 12-15 September 2022



Open application:
Researcher - spring 2022
Read more:
<https://haku.valtiolle.fi/Public/Assignment.aspx?guidAssignment=8eb2baf7-cb8d-4db3-9cbf-86201c675c33>

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