

FINNISH
WATER
FORUM



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SUOMI
FINLAND

Sustainable Water Solutions from Finland

Tommi Peho
Coordinator

Photo: Taneli Lahtinen



VISION

Clean water for everyone

MISSION

Finnish Water Forum's mission is to create sustainable solutions for global water, climate and biodiversity challenges with Finnish know-how and technology jointly with local and international actors

Finnish Water Forum – who we are?

- Finnish Water sector association
- Non-Profit organization
- Members (>130) include
 - Ministries
 - Universities and educational institutions
 - Research Institutions
 - Associations
 - Private sector companies
- Members knowledge covers all areas of water
- FWF is the “one stop shop” to Finnish Water partners



FINNISH WATER FORUM

GOVERNANCE

**PRIVATE
ENTERPRISES**

**ASSOCIATIONS
AND NGO'S**

**UNIVERSITIES &
SCIENTIFIC
INSTITUTIONS**

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Finnish Water Forum Members



Ministries

Ministry of Agriculture and Forestry
Ministry of the Environment
Ministry for Foreign Affairs
Ministry of Social Affairs & Health
Ministry of Economic Affairs & Employment

Associations, NGOs

Central Union of Agricultural Producers & Forest Owners (MTK)
Finnish Water Utilities Association
Global Dry Toilet Association of Finland
The Land and Water Technology Foundation
Association of Standardisation for Metal Industries
Federation of Finnish Water Protection Associations
Water Association of Finland
WaterFinns

Companies

Over 90 private sector companies

Research institutions

SYKE Finnish Environment Institute
LUKE Natural Resources Institute Finland
FMI Finnish Meteorological Institute
GTK Geological Survey of Finland
VTT Technical Research Centre of Finland

Universities and Schools

Aalto University School of Engineering
Environmental School of Finland
Häme University of Applied Sciences
Kajaani University of Applied Sciences
Lappeenranta University of Technology
Laurea University of Applied Sciences
Savonia University of Applied Sciences
Oulu University of Applied Sciences
Tampere University of Technology
Turku University of Applied Sciences
University of Eastern Finland
University of Helsinki
University of Oulu
University of Turku

WHY FINLAND?

Team
FINLAND

#1

WASTEWATER
TREATMENT

ENVIRONMENTAL
PERFORMANCE INDEX 2022

#1

SANITATION AND DRINKING
WATER

ENVIRONMENTAL
PERFORMANCE INDEX 2022

#1

SUSTAINABILITY
ON MANAGED
AQUIFER RECHARGE

UNESCO 2021

#1

LEADING COUNTRY IN
SUSTAINABLE
DEVELOPMENT

UN SUSTAINABLE DEVELOPMENT
REPORT 2022

#1

DIGITALIZATION
IN THE EU COUNTRIES

DIGITAL ECONOMY AND SOCIETY
INDEX (DESI) 2022

#1

MOST STABLE COUNTRY
IN THE WORLD

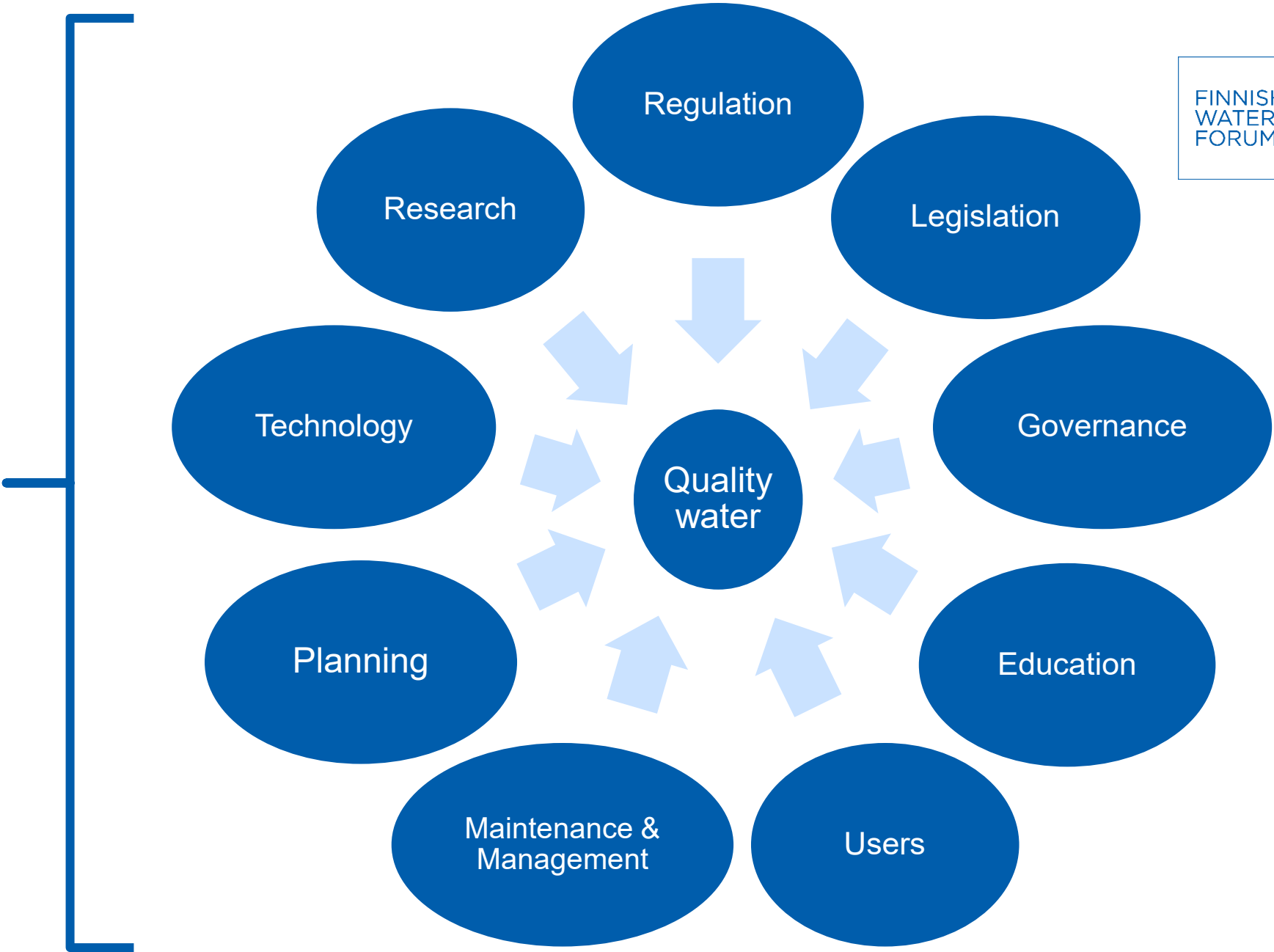
THE FUND FOR PEACE,
FRAGILE STATES INDEX 2022

#1

HAPPIEST
COUNTRY
IN THE WORLD

UN 2022 WORLD
HAPPINESS REPORT

Finnish
water
expertise
covers all
aspects of
water.



ENVIRONMENTAL MONITORING AND SMART WATER SOLUTIONS

Reliable real-time data is essential for modern water management

When contamination sources are identified in real-time, quick actions can be taken to prevent any problems. With novel sensor technologies, new parameters can be measured to improve decision-making of water resources management.

Smart water management solutions can be used to reduce water losses in potable, irrigation and waste water networks

Most sustainable way to produce water is to reduce water losses – there will be savings in energy, chemicals and water. Digital monitoring, access control to different facilities and cyber security will guarantee safe operation of water network.

Solutions includes:

- Integrated technologies, sensor networks and monitoring
- Predictive monitoring system for comprehensive management
- Improved system performance with safe E2E connections, hydraulic models, GIS, open-data and various algorithms



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WASTE WATER INTO ENERGY, FERTILIZERS AND WATER RE-USE

Finland is a forerunner in water-related circular economy and resource efficiency.

Waste water is used as a resource for producing energy, safe fertilizers and water for industry, agriculture and municipalities. Future solutions of waste water treatment already exist in Finland and can be implemented also elsewhere - protecting the environment and saving scarce water resources.

Solutions include:

- Design, planning, technology & construction of modern treatment plants
- Secured environmental safety and energy & resource efficiency
- Underground treatment plants for maximized land-use efficiency



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MANAGED AQUIFER RECHARGE (MAR) FOR DRINKING WATER PRODUCTION AND STORAGE

Artificial groundwater is one of the main water sources of Finnish water utilities.

Using surface water to recharge aquifers is a very cost-efficient method for drinking water production, but requires good knowledge on the local conditions and high-level expertise for successful implementation. Finnish actors have wide experience of practical and sustainable solutions.

MAR can also be used for water storage.

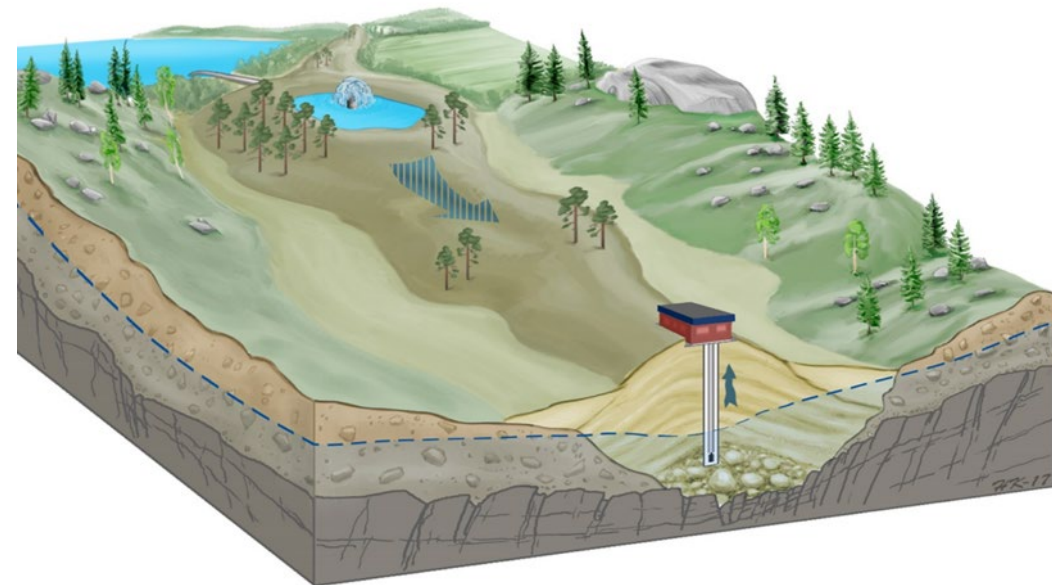
Solution includes:

- Geological and raw water surveys
- Feasibility studies, planning & design
- Measuring and monitoring technologies
- Construction supervision

Where: Kenya, Vietnam, Gulf Region, S-Africa and Central Asia



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MODULAR OFF-GRID WATER SOLUTIONS

Modular container solutions can be used in remote villages, holiday resorts and industrial applications to produce clean water and treating waste water

Also rescue and recovery from disasters and crises requires quick access to WASH.

All water can be made drinkable. Finnish innovations in water purification, wastewater treatment and recycling, together with water saving and managing solutions, can save lives in emergency and recovery settings.

Solutions includes:

- Comprehensive solutions for crisis management and WASH related challenges
- Deployable, modular and scalable solutions for field camps and other temporary or permanent needs
- Smart solutions for drinking and wastewater management to secure health, safety and efficiency



EDUCATION AND CAPACITY BUILDING

Capacity building is also important for sustainability – we need competent and skilled staff at private and public sectors to adopt sustainable water solutions

Finland has helped in capacity building for decades. Finland is also known for good results in education, such as in PISA tests for school children.

In addition to education and capacity building, Finland can help with schools sanitation, waste water treatment and clean water. This is important to give good infrastructure for good learning.

Solution includes:

- Certified vocational training in water
- Tailored courses for engineers and authorities
- Degree courses in water management for MSc level
- Professional teacher education
- Educational study tours to Finland

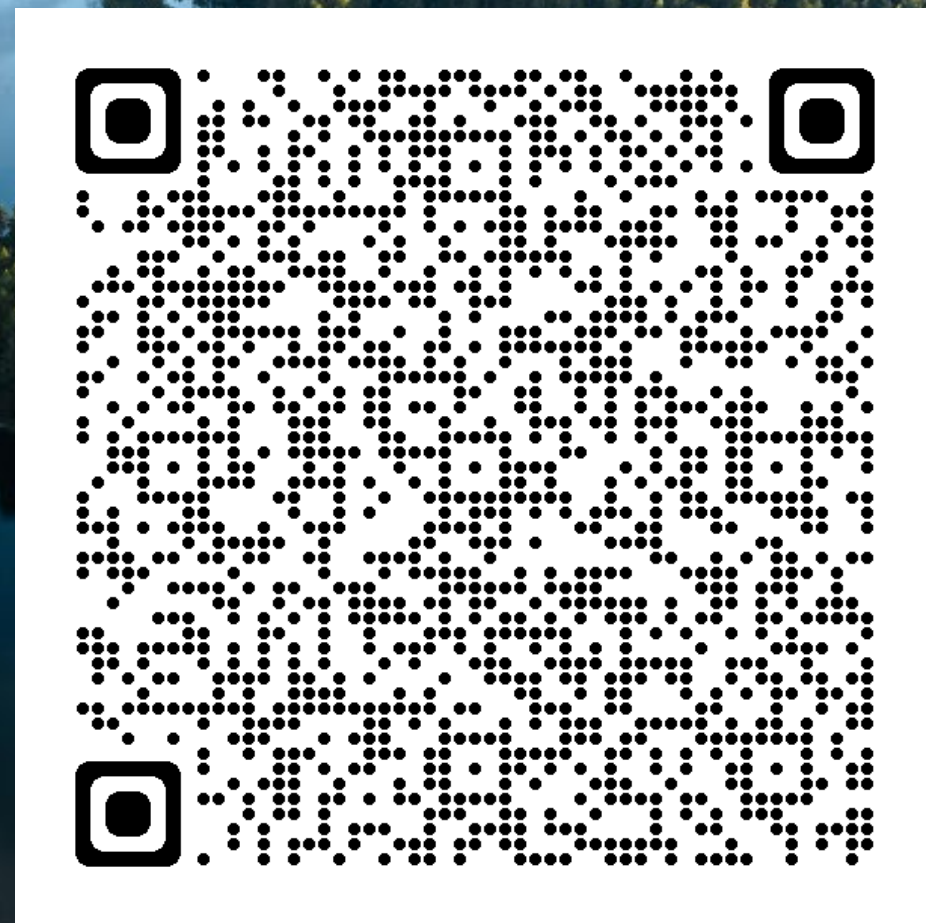


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WATER SOLUTIONS AND EXPERTISE FROM FINLAND

Scan the QR to read
more!



<https://www.finnishwaterforum.fi/wp/en/expertise/>

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Finnish Water Forum's ongoing projects

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Finnish Water Forum's collaboration in South Africa

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Briefly of our aim in South Africa

- FWF coordinates an EU-funded project in South Africa, which involves various Finnish companies offering a wide range of solutions for sustainable and efficient water management
- Operate on a challenge-based approach
- Provide applicable and targeted solutions that are based on the South African needs
- Develop functioning ecosystem services with long term improvements
- Utilize technology on a broad scale
- Aim to complete projects with local partners to improve the water security and management for more safe and secure water production
- Provide training to enhance the level of operations in the water sector
- Water sector includes water treatment and wastewater treatment

Key solutions for the South African Water Sector

- **Monitoring of Water Quality**
 - Realtime monitoring, software development and measuring of data in water production facilities and nature
- **Smart Water Management**
 - Smart digital solutions for water management, such as reduction of non-revenue water or water quality monitoring and asset management
- **Circular Economy Solutions**
 - Focus on reuse of wastewater and recovery of energy, metals and nutrients in wastewater
- **Water Safety and Security**
 - Focus on overseeing of access management, risk management and evaluation of operability
- **Water production and Water treatment Plants**
 - Production facilities for drinking water including desalination and purification of wastewater

FWF in South Africa

Finnish Water Forum visited Cape Town, Johannesburg and Tshwane in September 2023.

Meetings were held with the City of Capetown, Western Cape line departments, Gauteng province officials and city officials of Tshwane. In addition, various meetings were held with private companies and the Water Partnerships office.

Collaboration is being prepared on the municipal level with Cape Town, Western Cape, Tshwane and the province of Gauteng



On the premises: visiting Blackheath water treatment plant

Education and Capacity Building

- Capacity building has been a factor that continues to rise on discussions between Finland and South Africa. After all, a functioning water sector is dependent on competent and skilled staff both at private and public sectors
- Solution include:
 - Certified vocational training in water
 - Tailored courses for engineers and authorities
 - Degree courses in water management for MSc level
 - Professional teacher education
 - Educational study tours to Finland



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Finnish Water Forum's collaboration in India



Ministry for Foreign
Affairs of Finland



SUKHRALI LAKE REJUVENATION

PILOT PROJECT
GURUGRAM, HARYANA, INDIA



This project has received funding from



The European Union's Horizon 2020 research and innovation program under
Grant Agreement No. 821423



DEPARTMENT OF BIOTECHNOLOGY
MINISTRY OF SCIENCE & TECHNOLOGY, GOVERNMENT OF INDIA

The Department of Biotechnology, Ministry of Science & Technology,
Government of India, with sanction letter No. BT / IN / EU-WR / 60 / SP / 2018

Sukhrali Pond: Topography

Location: Sukhrali Village, Harijan Basti, Sector 17 C, Gurugram, Haryana

Extent: 10,641.91 Square Meters

Depth: 6 meters at Periphery, 16 meters at Center

Water Spread area: 8000 Sq Mtrs (approx.)

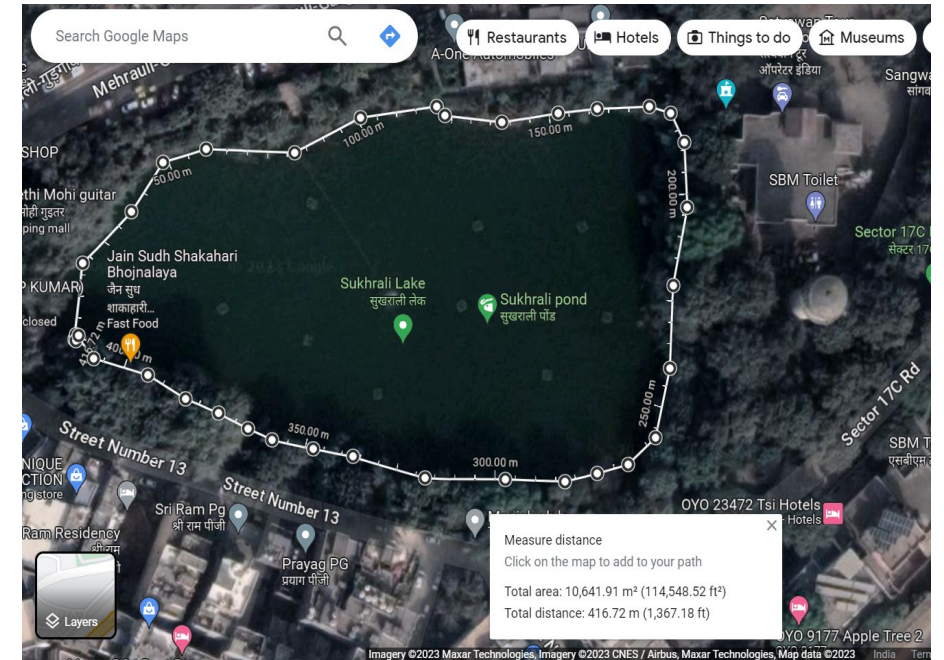
Water Depth: 3 meters towards dyke, 7 meters towards center

Approx Water volume: 40000 Cubic Meters (4 crore litres)

Present condition: Eutrophicated with Microcystis predominant in the lake

Fauna: Fish (Tilapia, Cat Fish, Rohu, Carps), A few migratory birds, black cormorants

Flora: Peepul, Mango, Flowering Trees, Shrubs, Herbs and grass, weeds inside the lake



Problem Statement

Found at site

Plastics, weeds, photos, POP idols, liquor bottles, plastic pouches, food packets, flowers, coconuts, dead trees, twigs and religious waste

Water quality

- Eutrophication
- Microcystis
- Light penetration up to 20 cms
- Low dissolved oxygen (2.6 PPM)
- High BOD (biochemical oxygen demand)

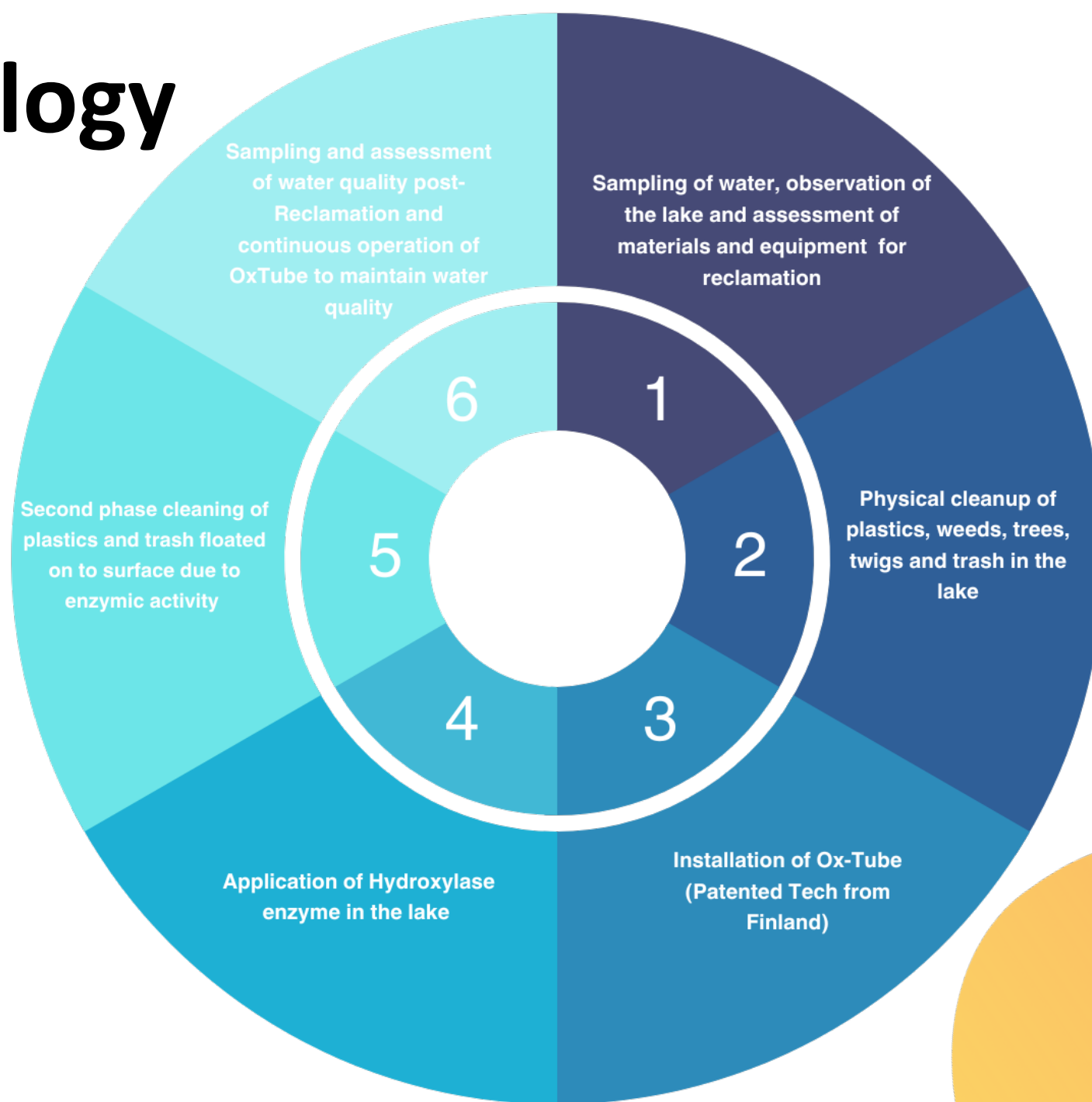
Negative impact

- Fishy smell of water
- Mosquito breeding



Eutrophication in lake (toxic algae microcystis predominant)

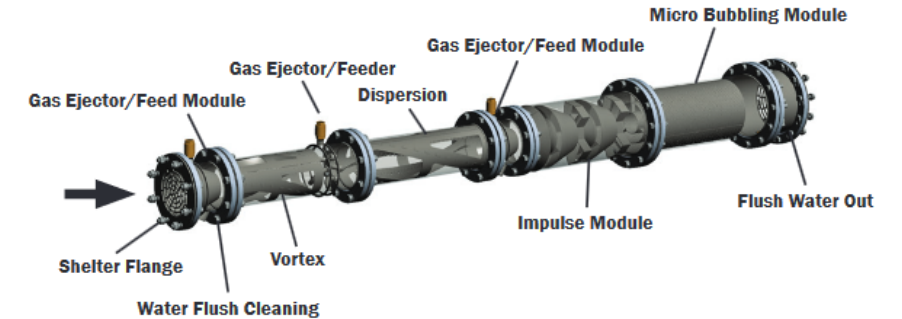
Methodology



Technological interventions

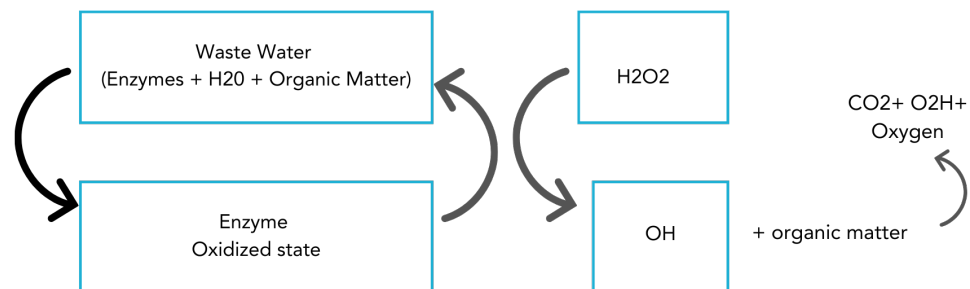
Oxtube by Sansox:

- A modular solution that can be retrofitted, easily removed, cleaned and installed in many stages of the water treatment process.
- Oxygenates water more rapidly and energy efficient when compared with existing systems.
- Can be applied with various treatment plants and natural water flows.



Hydroxylase Enzyme Cocktail by Elixir:

Bio-oxidation reaction



Outcomes

S. No.	Parameter	Before Reclamation	After Reclamation
1	Chemical oxygen Demand	314 mg/Lit	92 mg/lit
2	Total Suspended Solids	210 mg/lit	24 mg/lit
3	Total Dissolved Solids	378 mg/lit	309 mg/lit
4	Dissolved Oxygen	2.1 mg/lit	4.6 mg/lit
5	pH	6.8	7.3
6	Microcystis (Toxic Algae)	>600 CFU/ml (compact flotation unit)	<10 CFU/ml
7	Spirulina (Beneficial Algae)	< 100 CFU/ml	>680 CFU/ml
8	Diatoms (Beneficial zoo plankton)	120 CFU/ml	> 346 CFU/ml
9	Smell of Water	Fishy smell	No smell
10	Visibility	Less than 20 cm	More than 100 cm
11	Weeds and Debris inside water column	Spread around 0.5 acres of lake spread area	Completely removed and plastics, floating debris removed from lake.

Summary

- ✓ Increased light penetration (upto 1 meter)
- ✓ Reduced fishy odor in the lake water
- ✓ Improved Dissolved oxygen levels.
- ✓ Improved clarity of water
- ✓ Reduced Microcystis algae (toxic algae)
- ✓ Visitor satisfaction



August 2023



October 2023



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Finnish Water Forum's collaboration in Central Asia



Surface water monitoring system to Kyrgyzstan



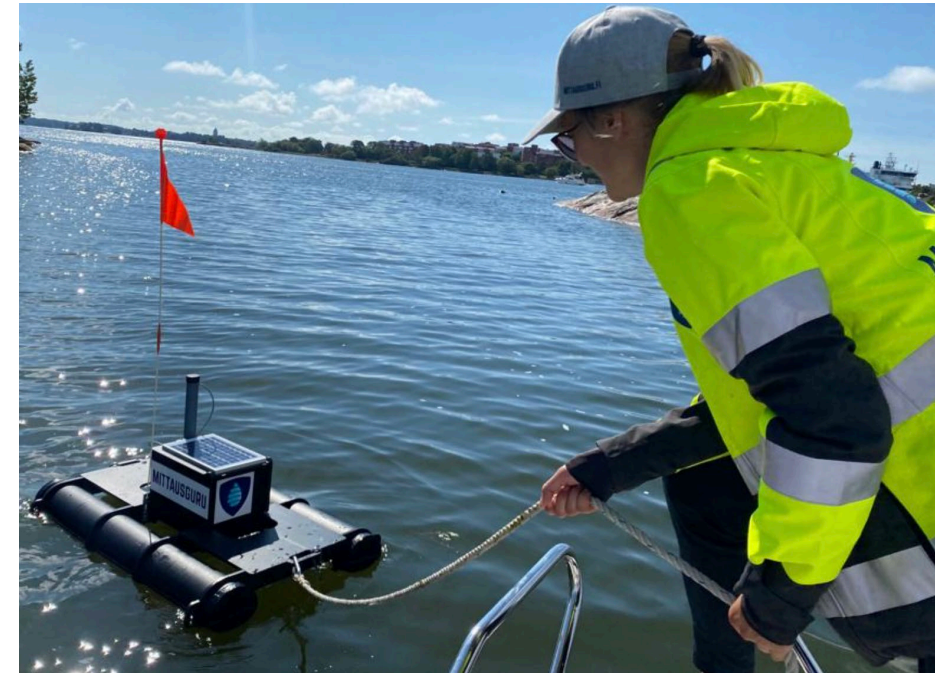
THE WORLD BANK

MINISTRY OF NATURAL RESOURCES,
ECOLOGY AND TECHNICAL SUPERVISION
OF THE KYRGYZ REPUBLIC



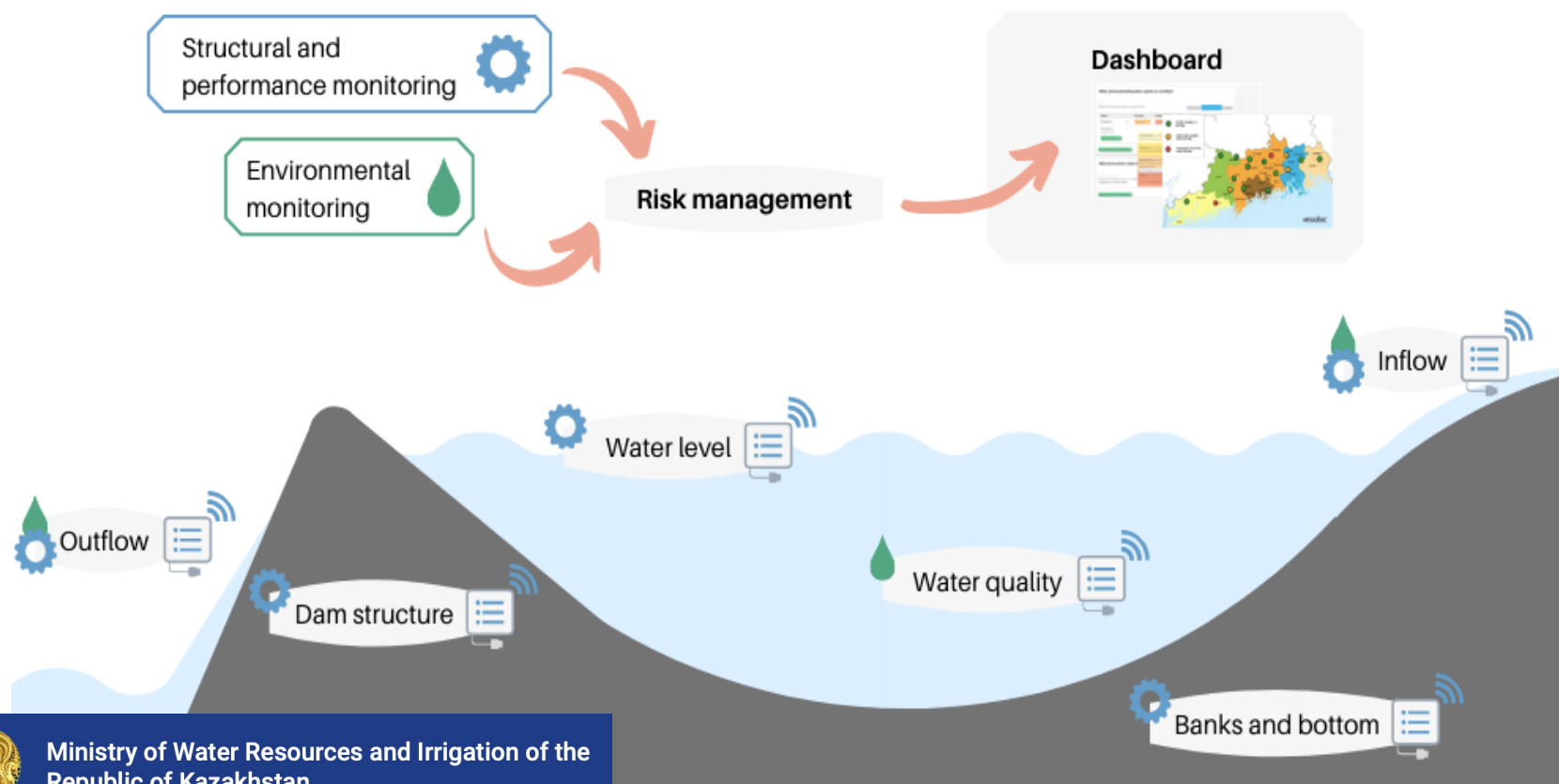
MITTAUSGURU

World Bank funded assignment in Kyrgyzstan to pilot autonomous online surface water monitoring system in four different part of the country, incl famous Issyk-Köl lake



Dam safety and security: ELY funded project in KAZ and UZB

"DigiWaDa – Enhancing Water and Dam management in Kazakhstan and Uzbekistan mining sector" - hankkeessa luodaan valmiuksia tarjota Kazakstaniin ja Uzbekistaniin patoihin ja patoaltaiisiin sekä kaivoksiin ja muuhun suuria vesimääriä käsittelevään /"vesi-intensiiviseen" teollisuuteen liittyvää suomalaista tietotaitoa ja osaamista. Kehittämispöytätyössä jalostetaan yhteisiä palvelukonsepteja ja viimeisimpään teknologiaan (ICT, digitaalisuus, Ai) perustuvia ratkaisuja.



Up-to-date information of the dam and dam reservoir condition:

- mechanical properties of the dam
- water quality (physical and chemical)
- ecological quality
- eutrophication
- biological measurements (biosensors)
- heavy metals in water
- water flow in the reservoir
- sedimentation and reservoir bottom information
- fish and vegetation
- weather (rainfall)

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Vientikaupan
perusasioista yleisesti

Vientikaupan check-list

- Resurssien allokointi: paljonko aikaa ja rahaa hankkeeseen voidaan käyttää, ja mitä sillä tavoitellaan?
- Onko rahoitus varmistettu? Mitä mahdollisia tuki-instrumentteja voisi hyödyntää rahoituksen tueksi ja miten riittävä rahoitus taataan?
- Ketkä ovat relevantit paikalliset yhteistyökumppanit ja mikä heidän sitotumisasteensa on?
- Strategiset valinnat: mitä ongelmaa ratkaistaan, kuka on asiakas? Onko paikallinen kunta/yritys/vesilaitos sitoutunut tekemään parannuksia? Onko tähän olemassa resursseja, ja kuka toimintaa rahoittaa?
- Paikallinen markkinatuntemus. Tunnetaanko markkinat tarpeeksi hyvin?
- Mikä on lyhyen ja mikä pidemmän tähtäimen suunnitelma? Millaista jatkoa tavoitellaan?
- Toteutetaanko hanke itsenäisesti, vai osana laajempaa verkostoa esimerkiksi tutkimuslaitosten, korkeakoulujen, yhdistysten tai yritysten kesken? Onko sitoutuminen ja vastuunjako selkeää?

Mitä viennillä voi saavuttaa?

“Vesivarat ovat maapallon yhteiset”

- Veden merkitys kasvaa globaalilla tasolla jatkuvasti ja ilmastonmuutokseen sopeutuminen tulee edellyttämään yhä enemmän toimia vesivarojen järkevään ja kestävään käyttöön. Tähän kuuluu olennaisesti vesivaroista ja ympäristöstä huolehtiminen
- Vienti kehittää myös omaa toimintaa ja opettaa tarkastelemaan sitä ulkopuolisin silmin -> Kansainväliset projektit ja hankkeet kehittävät myös sen osallistujien ymmärrystä ja osaamista
- Viennin myötä kerätään arvokasta kokemusta erilaisista toimintaympäristöistä ja parannetaan yhteistyön edellytyksiä laajemmin
- Verkostoituminen yhteisten hankkeiden kautta opettaa vesien hallinnasta laajasti
- Vienti parantaa parhaassa tapauksessa järjestön uskottavuutta, sen rahoituspohjaa ja asiantuntemusta

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Vesiensuojeluyhdistyksen vientimahdollisuudet

Vesiensuojeluyhdistysten vientimahdollisuudet

- Vesiensuojelun keskusliitto on ainutlaatuinen organisaatio, jolla on pitkä historia sen toiminnassaan
- Mitä annettavaa vesiensuojeluyhdistyksillä on? Kattava asiantuntijuus:
 - Vesiensuojelu ylätason näkökulmasta: lainsäädännön kehittäminen, lausuntojen tarjoaminen
 - Viranomaisyhteistyön kehittäminen viranomaisyhteistyön kautta
 - Käytännön toimet: oikean tiedon kerääminen ja kartoittaminen sekä toimenpiteiden suunnittelu
- Miten vesiensuojeluyhdistykset joko keskusliiton kautta, tai alueellisina yhdistyksinä voisivat tarjota:
 - Referenssit: hyvien ja toimivien käytäntöjen ja kokemusten jakaminen vesilaitoksille, yrityksille, kunnille ja käyttäjille. Mitä Suomessa on tehty oikein ja millaisia tuloksia täällä on saavutettu?
 - Laboratoriomittaukset ja veden laadun valvonta: miten tämä kuuluu tehdä, ja voimmeko me tarjota asiantuntemustamme tai palveluitamme myös ulkomailla?
 - Koulutukset: lyhyet käytännön koulutukset paikan päällä, etänä toteuttavat teoriapainotteiset opetuspaketit tai vierailut

FWF & vesiensuojelu

- FWF:llä on ollut keskusteluja vesistön kunnostuksesta mm. Intiassa, Kiinassa ja Etelä-Afrikassa
- Esimerkkitapaus: suomalaiset toimijat voisivat kunnostaa järven yhteistyössä paikallisten kanssa tarjoten erityisosaamista
- Tarkoitus tehdä kehitysyhteistyörahoituksella tai paikallisella rahoituksella (esimerkki: Kiina). Kiinassa pystyvät toteuttamaan vesiensuojelu/kunnostusprojektin itse, mutta haluaisivat täsmäneuvontaa: miten varmistaa ekologinen ja kestävä toteutus?
- FWF:llä vierailee delegaatioita vuosittain tutustumassa suomalaisen vesihuollon toteuttamiseen. Näihin voisi yhdistää vierailuja ja tutustumista vesiensuojeluyhdistyksen toimintaan

Vesien suojelu & vesiensuojeluyhdistys

- FWF:ltä on yleisesti kysytty miten vesiensuojelua voisi toteuttaa, ja olemme kertoneet yhdistyksistä
- Vesiensuojeluyhdistys voisi esimerkiksi tarjota tukea seuraaviin asioihin: konseptisuunnittelu, referenssikäynnit ja mahdollisesti koulutus
- FWF näkee yhteistyön vesiensuojeluyhdistyksen kanssa tärkeänä ja tulevaisuudessa vesistöjen kunnostuksen saralla voitaisiin tehdä enemmän yhteistyötä. Tälle on ollut kysyntää, ja asiantuntemusta kaivattaisiin lisää.
- Roolin ei tarvitsisi välttämättä olla iso, vaan se voisi olla esim. referenssinä olo ja asiantuntijana kommentointi.
- Vesiensuojeluyhdistys voisi tarjota asiantuntemustaan ja ottaa kantaa suunniteltuihin toimenpiteisiin ja ratkaisuihin: onko suunnitelma toimiva, miten sitä pitäisi kehittää?

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Kiitos!

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