# The Pavitra Ganga Technology and Learning Network

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**7 June 2023**

# PAVITRA GANGA: project goal and approach


**Unlock environmental and economic potential wastewater treatment / re-use & resource recovery (RRR)**


This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 821051.
This project has been co-funded by Department of Biotechnology (DBT), Government of India.

# Project consortium

PAVITRA GANGA

vito

IHE DELFT

Consiglio Nazionale delle Ricerche

teri
The Energy and Resources Institute

IIT Delhi
Indian Institute of Technology Delhi

TU Delft

Hochschule Bochum
Bochum University
of Applied Sciences

IIT Kanpur

AQUA-Q
Online Water Control & Ozone Application

Aquafin

ION EXCHANGE
Refreshing the Planet

n|w Fachhochschule Nordwestschweiz

IRAP
INSTITUTE FOR RESOURCE ANALYSIS AND POLICY

Akvo.

14 partners: 3 RTOs – 6 UNIs – 3 SMEs – 1 Water Utility – 1 Industry

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# Pavitra Ganga Capacity Building Approach

- 6 Thematic **Workshops** covering three key pillars of the project:

  Smart water management, Water governance and Wastewater treatment and resource recovery
- **Open course materials** based on Workshops
- **Stakeholder engagement** and **co-creation events**
- **Training** of water professionals **on different water treatment technologies**, laboratory and pilot plant experimentation (MSc, PhD and PostDocs)
- **Training in water sampling** protocols, use of sensors, test kits and analytical instruments for **water quality monitoring**

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# Six workshops in Pavitra Ganga to build the capacity of water professionals

- Water management decision support systems **(Lead: VITO**; contributors: CNR-IRSA, IRAP)
- Benchmarking water quality and quantity and use of mobile monitoring solutions (**Lead: AKVO**; contributors: VITO, IRAP):
- Safety planning for wastewater reuse (**Lead: IHE Delft and FHNW; ** contributor: IIT Delhi; IIT Kanpur)
- Multi-criteria Decision (MCD) models to support regional water management (**Lead: TUD**; contributors: IHE Delft, TERI, IRAP)
- Innovative technologies for wastewater treatment and reuse/recovery (**Lead: IHE Delft**; contributors: IIT Delhi, IIT Kanpur, CNR-IRSA, TUD, VITO, FHNW)
- Indian wastewater: challenges and solutions (**Lead: IIT Kanpur; ** contributors: TUD, FHNW, VITO, IIT Delhi, HBO, IRAP)


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# Workshop 1. Water management decision support systems (VITO, CNR-IRSA, IRAP) – planned for October 2023

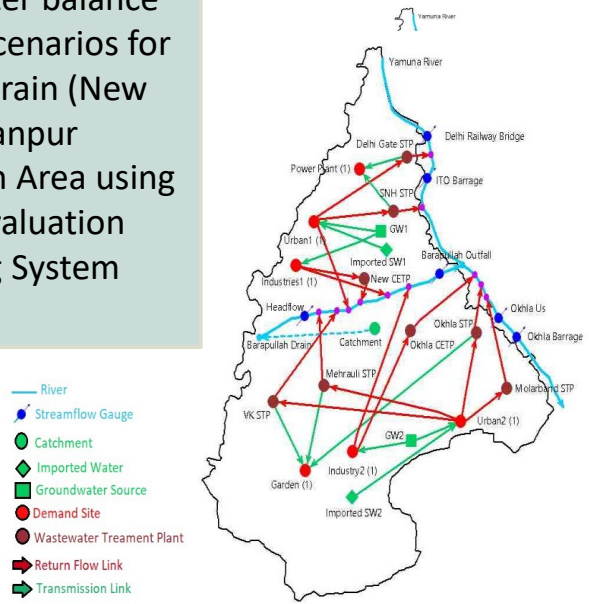
Smart Water Management

**Scope:** Modelling and monitoring tools for water management decision support systems

**Structure:**

- WEAP modelling tool
- Development and use of scenarios - ‘Business as usual’, ‘higher population growth’, ‘STP efficiency improvements’, and ‘higher economic growth’
- regional climate change models

Regional water balance model and scenarios for Barapullah Drain (New Delhi) and Kanpur Metropolitan Area using the Water Evaluation and Planning System (WEAP)




Main messages

- Scenarios provide rich information on water management options in a changing climate
- All scenarios indicate that current planned STP infrastructure insufficient to meet likely demand by 2040
- Changing climate exacerbates situation

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# Workshop 2. Safety Planning for Wastewater Reuse (IHE Delft, FHNW) – Jan 2023 IWA Water Reuse Conference - Chennai

Water Governance

**Scope:** Introduce the concept and approach of 'wastewater safety planning' inspired by the WHO SSP manual

**Structure:**

- Wastewater related health risks (for workers, farmers, communities)
- Occupational safety and health – do's and don'ts
- WHO's risk management approach
- Group exercise: Technology based semi-quantitative risk assessment


Main message

- Technology-based water reuse safety planning is key to occupational safety and health risk management

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# Workshop 3. Benchmarking water quality and quantity and use of mobile monitoring solutions (AKVO, VITO, IRAP) – planned for October 2023

Smart Water Management

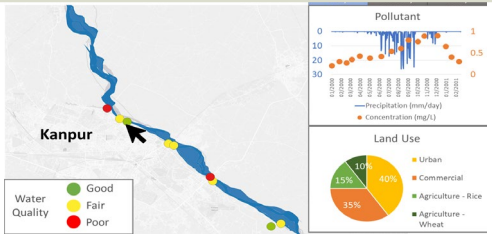
**Scope:** Data collection and monitoring tools to benchmark water resources

**Structure:**

- Community surveys to assess ambient ground water quality
- Assessment of results from Kanpur and New Delhi
- Use of sensors and dashboards to flag up water quality issues

Surveying of ground water in Kanpur villages receiving treated wastewater for irrigation ('22 & '23)

Dashboard - modelled and monitored data




Main messages

- Handheld devices with short questionnaire surveys provide rapid appraisal of water resource issues
- Dashboard on smart phones improves communication & transparency
- High EC values flag up contamination problems for groundwater resources

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# Workshop 4. Multi-criteria Decision (MCD) models to support regional water management (TUD; IHE Delft, TERI, IRAP) IWA Wastewater, Water and Resource Recovery Conference), Poznan (Poland) April 2022

**Scope:** Facilitate multi-actor problem structuring and multi-criteria decision analysis

**Structure:**

- Problem Structuring in Decision Analysis Processes
- Developing and assessing solutions using Multiple Criteria Decision Analysis (MCDA)
- Stakeholder Engagement for Technological and Policy Support
- Group exercise


Main messages

- Proper problem structuring is critical to map priorities and link issues
- Good decision making is key to better wastewater management
- MCDA methods are useful to address decision problems that are too complex for common sense

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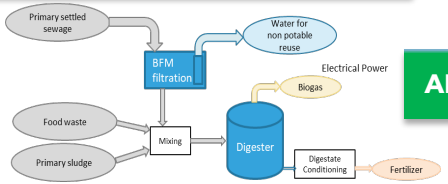
# Workshop 5. Innovative technologies for wastewater treatment, reuse and recovery

Wastewater treatment & resource recovery

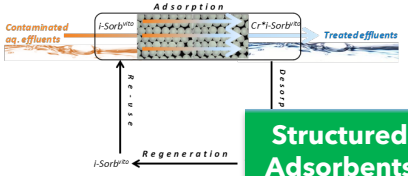
## Bulk organics and nutrients removal




ANDICOS

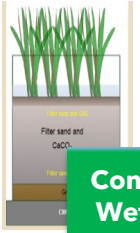

Self Forming Dynamic-MBR

## Polishing of problem compounds




Structured Adsorbents

Photo Activated Sludge




Constructed Wetlands +

Ozonation

Clean Blocks

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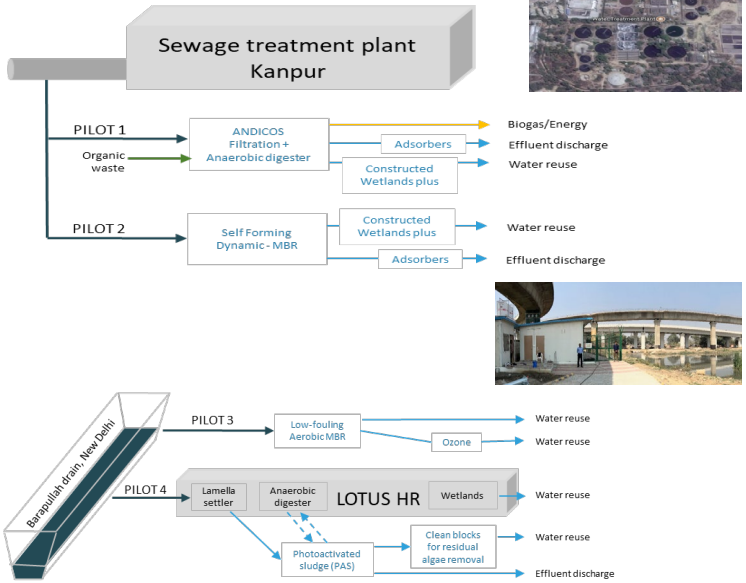
# Workshop 5. Innovative technologies for wastewater treatment, reuse & recovery (IHE Delft; IIT Delhi, IIT Kanpur, CNR-IRSA, TUD, VITO, FHNW) – planned for October 2023

Wastewater treatment & resource recovery

**Scope:** Design, operation & effectiveness of project's innovative treatment technologies

**Structure:**

- Introduction to innovative technologies (Andicos, Self forming dynamic – MBR, CW+, Structured adsorbents, Clean blocks, Aerobic MBR, PAS)
- Design exercises to integrate treatment trains for reuse
- Field visit to pilot sites






## Main messages

- Low energy (or energy producing) secondary treatment can reduce operating costs and GHG emissions
- Polishing technologies are essential for removing contaminants of emerging concern and deliver "safe" treated wastewater for re-use

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# Workshop 6. Wastewater Treatment and Reuse in India: Challenges and Solutions

**Scope:** Create awareness among stakeholders (research, government and private) of the main challenges for India's wastewater treatment.

**Structure:**

- Overview of most important pollutants & emerging pollutants
- Address specific changing climate and hydrological conditions
- Present solutions within the current economic, policy and regulatory framework

Integration of Pavitra Ganga pillars to define pathways to achieve SDG 6


**Proposing Workshop 6 as part of the Joint Final Conference of EU – India Water Projects in January 2024**

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# Registration for Pavitra Ganga Open Course Network

https://pavitra-ganga.eu/en/registration-pavitra-ganga-open-course-network

To be launched soon!

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PAVITRA GANGA

Follow us!
We have a lot of news and deliverables coming up in 2023!

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Pavitra Ganga Project
Organization

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