The opportunities to deliver zero pollution in India through wastewater treatment and resources recovery (Pavitra Ganga)

Paul Campling (VITO)

PAVITRA GANGA – consortium

vito

UNESCO 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

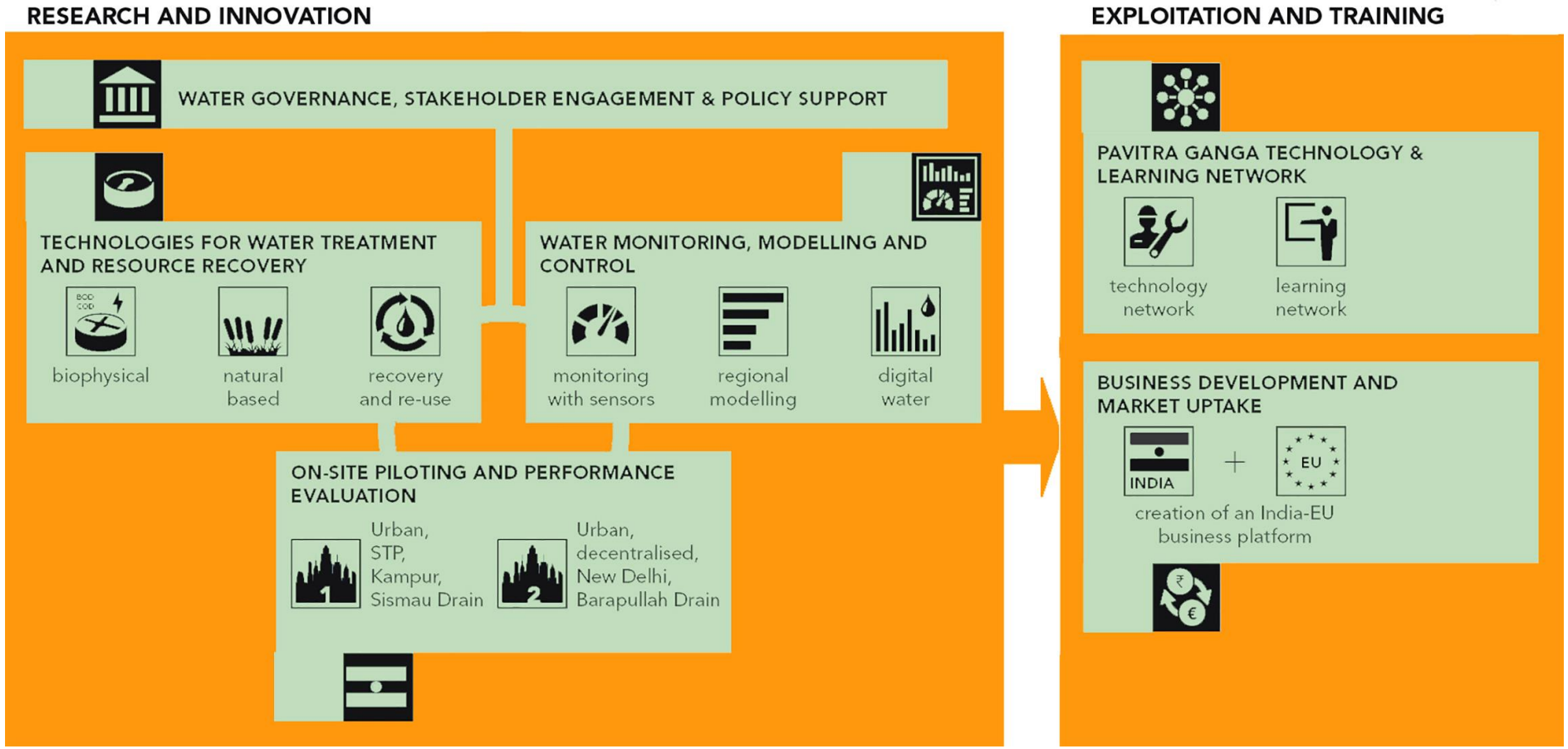
Akvo.

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

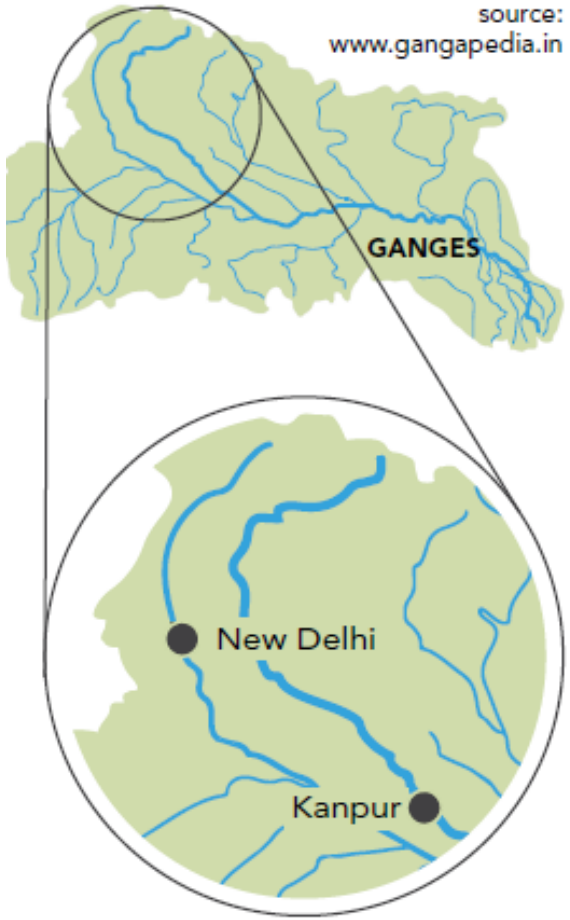
PAVITRA GANGA

PAVITRA GANGA – objectives and approach

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

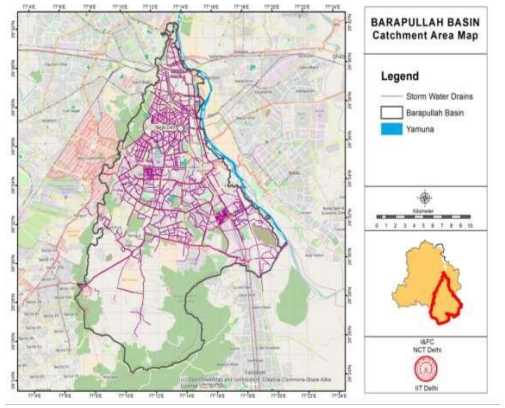


PAVITRA GANGA – geography



Barapullah Drain, New Delhi
Storm water drain currently polluted by domestic + industrial (also hospital) waste:

- Heavy metals
- Pharmaceutical residues
- Antibiotic resistant organisms
- Solid waste



Jajmau Treatment Plant, Kanpur
***Large cluster of tanneries – industry waste mixing with domestic sewage*:**

- Heavy metals (Cr)
- Sulphates + nitrates

Wastewater reuse scheme impacted

Water governance and socio-economic issues: Pavitra Ganga approach

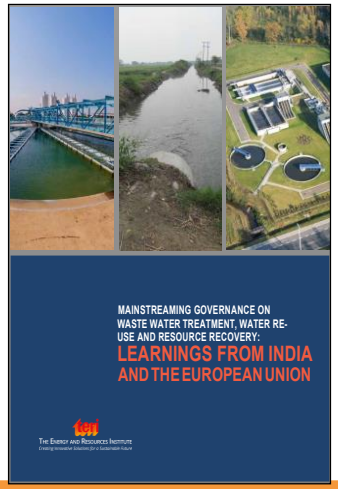
Engagement with stakeholders essential!

Understand

Co-create

Collaborate

- Policy brief: **Mainstreaming governance on waste water treatment, water re-use and resource recovery: lessons from India and the European Union**
- https://pavitra-ganga.eu/sites/pavitraganga/files/D2.1_Policy%20Brief_Mainstreaming%20Governance%207.10.2020.pdf



13 cases to identify **barriers** and **factors** for good governance

Socio economic issues and water governance: key messages

Socio-economic issues:

Low cost recovery + Poor Operations & Maintenance of STPs ⟫ Low performance of STPs (50% compliance – CPCB 2021)

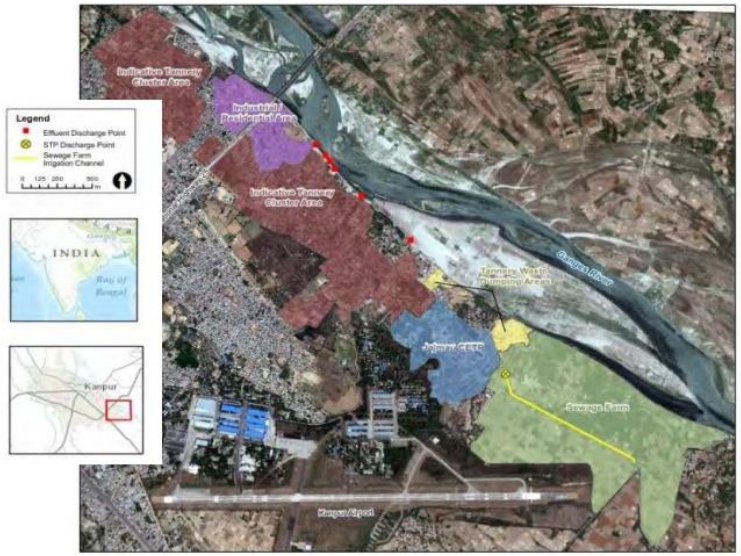
Water **Governance** issues:

Strengthen institutional & monitoring capacity + Target based policies ⟫ Effective enforcement strategy for pollution control

Water re-use issues:

National water re-use standards needed ⟫ Waste water safety + Level playing field

Water governance: Waste water safety planning



World Health Organization

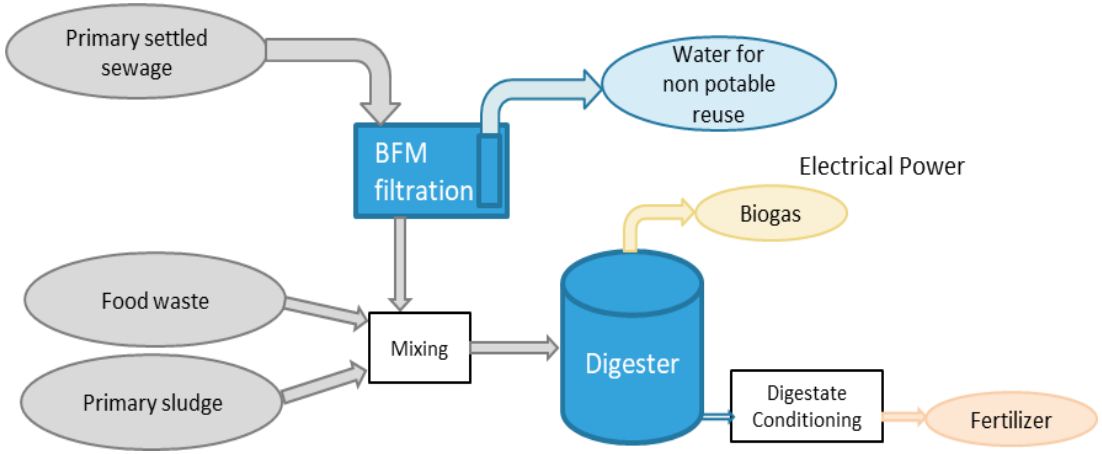
Stakeholder management in collaboration with

Solidaridad

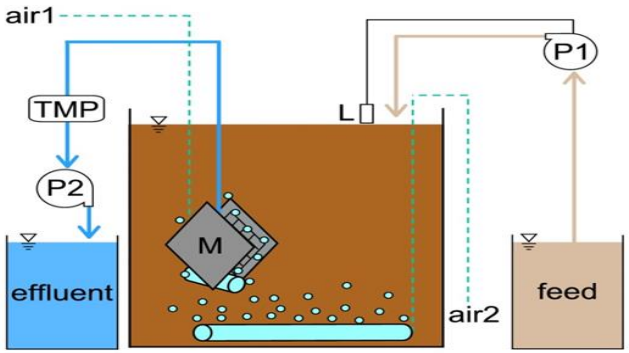
Selected technologies to remove and manage pollution

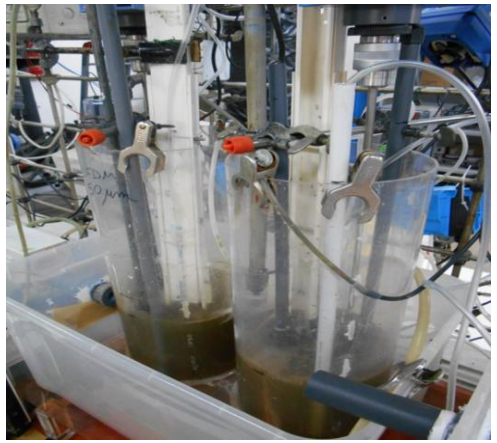
WW treatment – bulk organics and nutrients removal

ANDICOS™ combines concentrated sewage + organic waste to improve Anaerobic Digestor efficiency (also treats wastewater)



Self-Forming Dynamic MBR – "pseudo MBR" which forms a biological layer supported by an inert mesh

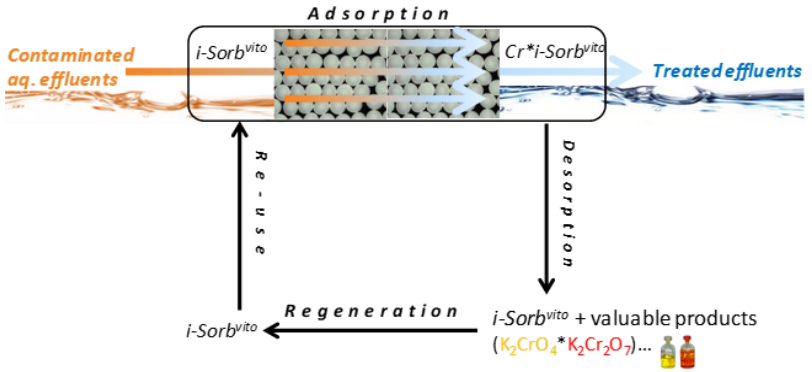




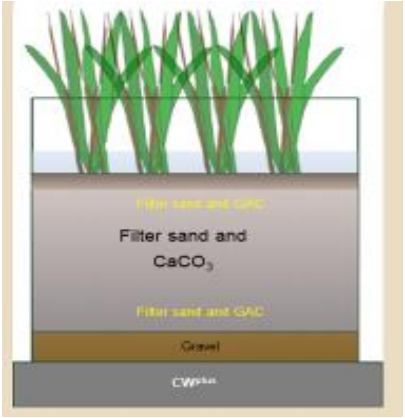
Selected technologies to remove and manage pollution

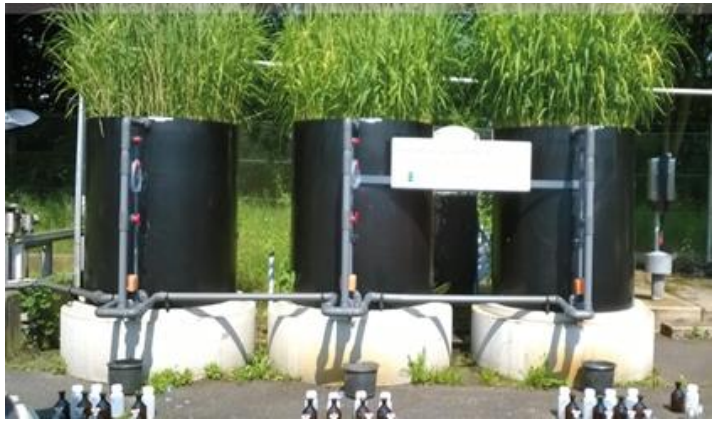
WW treatment – "polishing" to remove micro-pollutants

Structured adsorbers – manufactured composites with high binding capacities + fast kinetics – designed to remove Cr



Constructed wetlands plus – low energy treatment + adsorptive substrates to remove heavy metals





Selected technologies to remove and manage pollution

WW treatment – "polishing" to remove micro-pollutants

Aquatrack + Ozonation – dosed removal of micro organisms & micropollutants

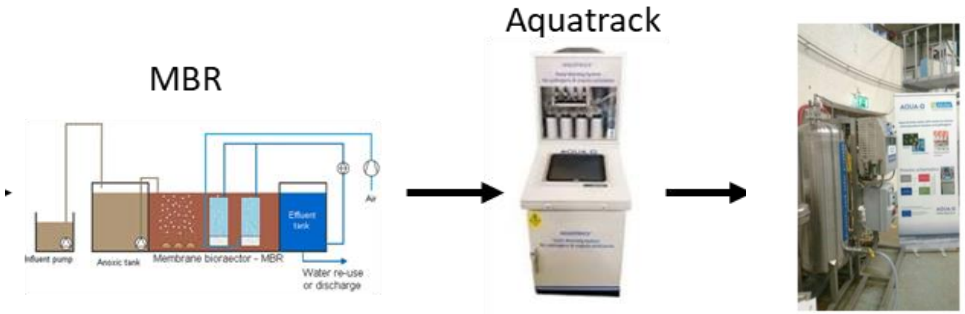
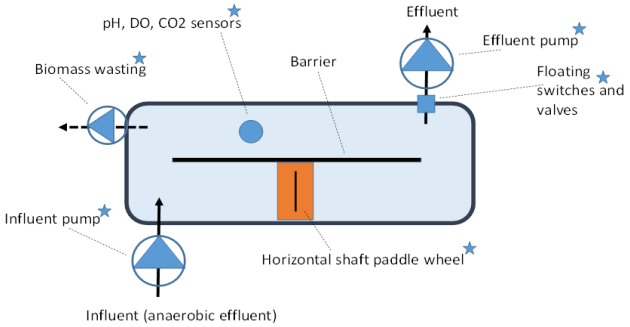
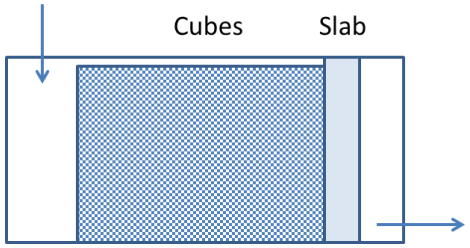


Photo-activated sludge – merger of high rate algae ponds + activated sludge systems removes N & other organics



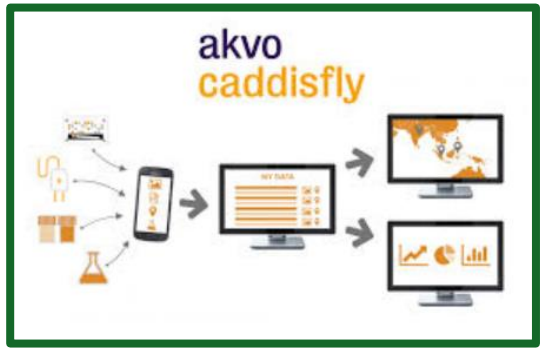
Clean Blocks - Biofilm carrier for nutrient removal, filtration for suspended solids



Selected technologies to remove and manage pollution

Monitoring

Mobile sensors connected to smart phones / dashboard



Stationary sensors triggering grab sampler

Finger printing to trigger sampler + ozonation treatment

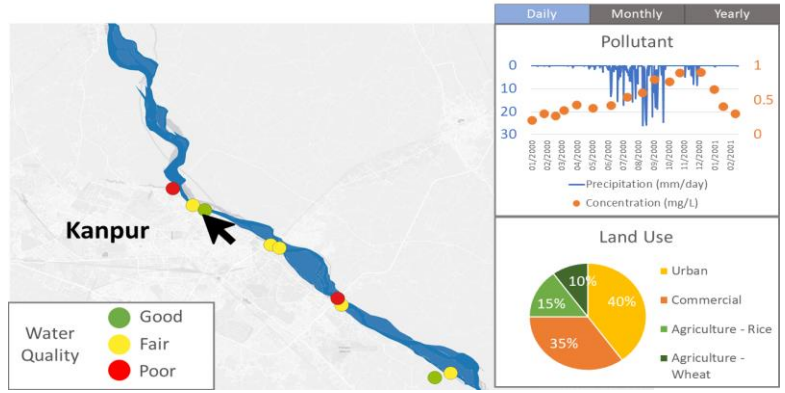
Modelling

weiss
Planning Support System

Spatial emissions assessment

WEAP
Water Evaluation And Planning System

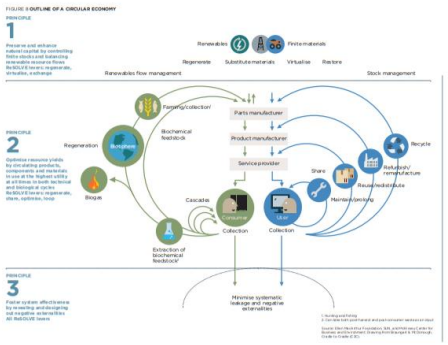
Scenario analysis of tecnological interventions



Dashboard to communicate information

Three ways for the Circular Economy to deliver zero pollution

1



Circulate materials as long as possible at different levels and cascades

- Green energy & nutrients (e.g. ANDICOS, PAS)
- Recovery of metals (e.g. Structured Adsorbents, CW+)
- Different cycles for technical and bio materials

2

Incentivise resource recovery & safeguard economic viability:

- Waste water reuse as a viable alternative water source
- Water pricing that reflects the actual costs of delivering water
- Stricter control & follow up of freshwater permits
- Rethink existing business models (sharing economy etc….)

3

Safe & Healthy

Ensure safety and quality of water and recovered products:

- Establish risks - wastewater safety planning
- Improve monitoring & analytical protocols
- Deliver proven polishing technologies

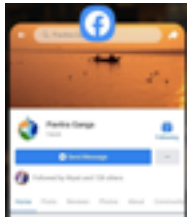
More information about Pavitra Ganga

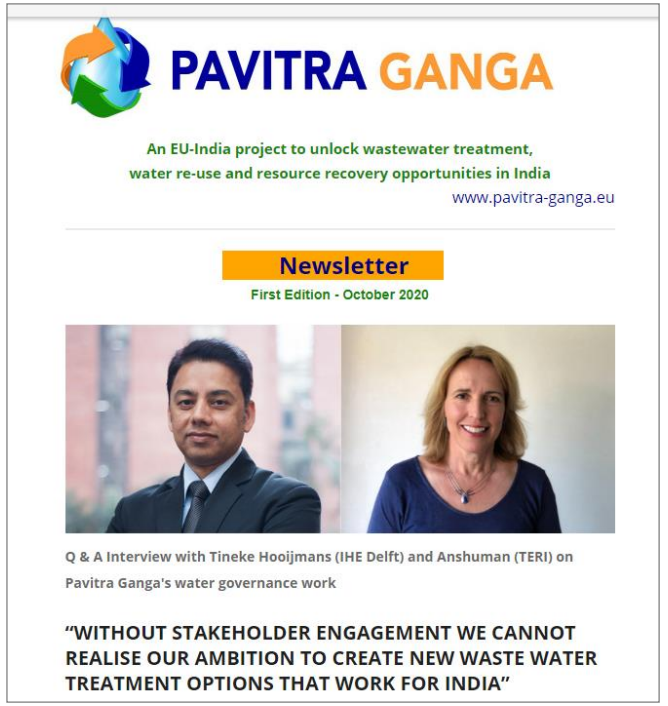
https://pavitra-ganga.eu/en

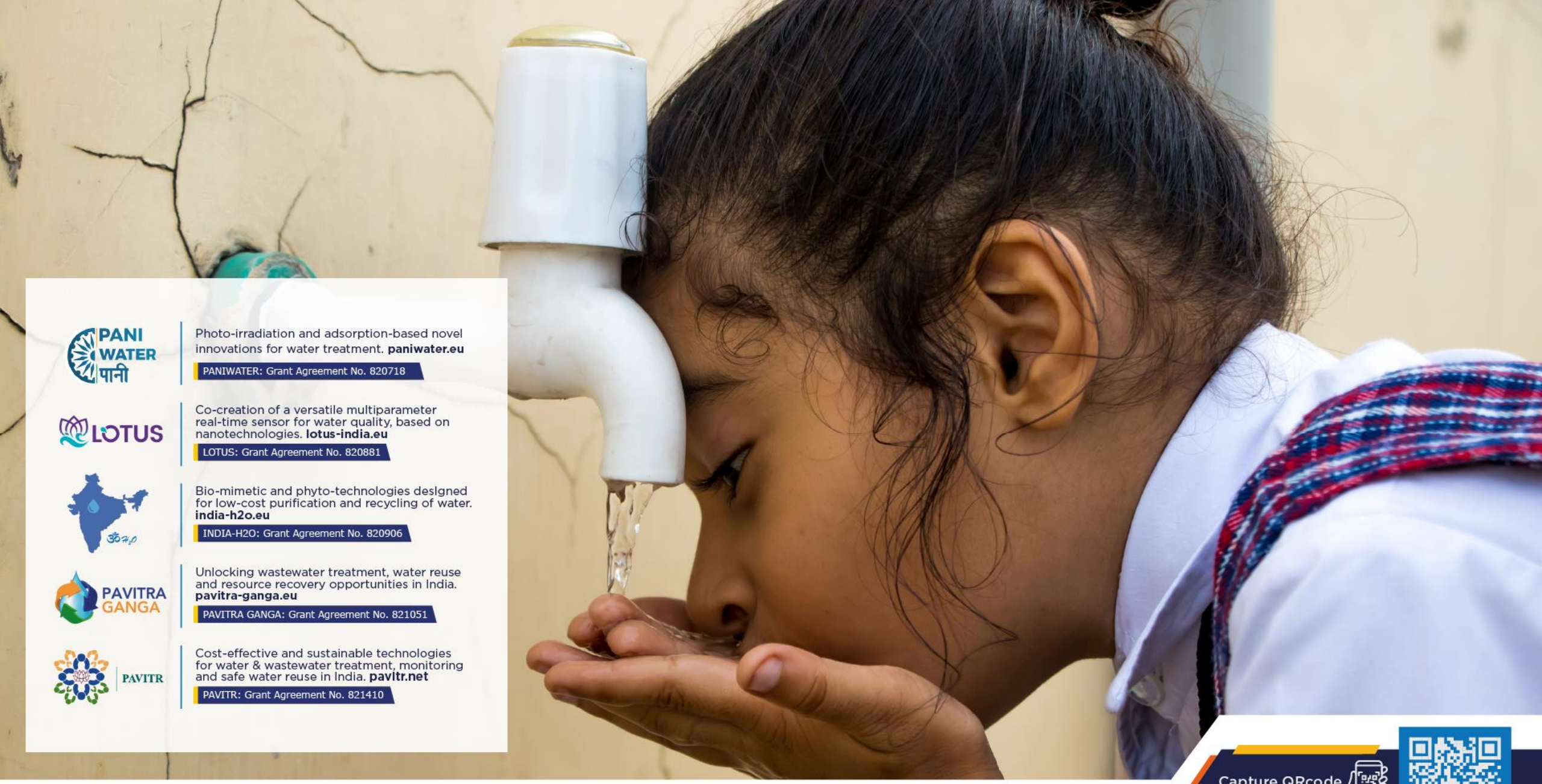
https://twitter.com/pavitra_ganga

https://www.facebook.com/PavitraGangaEUIndia

https://www.linkedin.com/company/pavitra-ganga-project







PANI WATER पानी

Photo-irradiation and adsorption-based novel innovations for water treatment. **paniwater.eu**

PANIWATER: Grant Agreement No. 820718

LOTUS

Co-creation of a versatile multiparameter real-time sensor for water quality, based on nanotechnologies. **lotus-india.eu**

LOTUS: Grant Agreement No. 820881

Bio-mimetic and phyto-technologies deslgned for low-cost purification and recycling of water. **india-h2o.eu**

INDIA-H2O: Grant Agreement No. 820906

PAVITRA GANGA

Unlocking wastewater treatment, water reuse and resource recovery opportunities in India. **pavitra-ganga.eu**

PAVITRA GANGA: Grant Agreement No. 821051

PAVITR

Cost-effective and sustainable technologies for water & wastewater treatment, monitoring and safe water reuse in India. **pavitr.net**

PAVITR: Grant Agreement No. 821410

The **HRB - Horizon Result Booster** is an initiative funded European Commission, Directorate General for Research and Innovation, Unit J5, Common Service for Horizon 2020 Information and Data.

Capture QRcode or follow this URL

horizonresultsbooster.eu