PAVITR: project presentation and report from the Kick off Meeting in New Delhi, 14-15th February 2019

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PAVITR: rationale and team

The aim of PAVITR (Potential and Validation of Sustainable Natural & Advance Technologies for Water & Wastewater Treatment, Monitoring and Safe Reuse in India) is to develop, validate, and deploy cost-effective & sustainable solutions to tackle water challenges and ensure the provision of safe water reclamation, rejuvenate water quality of rivers, and restore degraded ecosystems in India. This will be achieved by developing & deploying innovative water-wastewater technologies, and the use of novel sensors for the detection of emerging and traditional pollutants. The project also aims at developing innovative management & planning strategies to enable better and real time monitoring environmental quality and of pollution levels. Through our ambition, new methodologies, deployment of novel technologies and their validation under Indian conditions will help to address drinking water and wastewater challenges. To this aim, PAVITR envisages deploying-demonstrating novel and innovative holistic water, wastewater management approaches for the treatment & recovery of water, nutrients, and energy from urban, peri-urban & rural for their safe reuse in India, following Circular Economy principles. The background concept of PAVITR has been originated from the experiences, knowledge, technologies developed / deployed, ideas as well as the problems and need found on the experimental development of two successful projects "SWINGS and NaWaTech" implemented in India and Europe within EU-India Water Collaboration (FP7 Framework). The Indian and European partners of SWINGS and NaWaTech have collaborated extensively within their projects to enhance and enrich each other's technological & scientific knowledge and management capacities to cope-up with increasing water related issues and challenges. Therefore, the PAVITR incorporates new ideas and fills-up the gaps in the experimental pilot set-ups, synergy chains and co-branding between SWINGS and NaWaTech projects with a greater commitment to provide much more efficient and effective solutions to deal with water challenges in India, within the sustainable approaches. PAVITR project counts 12 EU and 9 Indian partners.

PAVITR will develop **5 key clusters** to identify viable, cross-sectorial and integrated perspective for the recovery of resources from the water cycle, while complying with all the relevant legal, societal and market challenges, i.e. pushing the PAVITR circular economy approach depicted in Figure 1:

Clusters:

A. Water & Rainwater Research Cluster
B. Wastewater Treatment Research Cluster
C. Strategy and Decision Making Research Cluster
D. High-resolution Management Research Cluster (HRM-RC)
E. Business Studies Research Cluster (BS-RC)

To this aim, **several prototypes**, suitable to Indian context, will be installed; including both nature-based and technological solutions. A relevant number of them will involve the use of **nature-based solutions (NBSs), linked to the wetland technology**, including the use of vertical flow constructed wetland systems in conjunction with a technological advanced oxidation stage to remove emerging pollutants. Also the

combination of constructed wetlands with advanced anaerobic reactors, single stage "French" reed beds for the treatment of raw wastewater, and sludge treatment plants. All the solutions will be designed considering the potential in terms of circular economy; for instance, regarding wetland solutions, treating the effluent of anaerobic reactors aimed at harvesting energy, or providing nutrient rich effluents suitable for crop irrigation of not-edible products or biomass production. NBS will also be established for biomass, i.e. Short Rotation Plantation and Willow evaporative Systems, and fertilizer, i.e. high rate algal ponds, production.

Additionally, PAVITR project aims to contribute in terms of **planning**. An innovative GIS based decision support system will be established and tested during the project, to help in the decision in terms of best technology to be adopted where necessary. The performance of the established systems will be optimized based on innovative sensors, specifically developed for the technologies and running under Indian conditions. For instance, sensor based on constructed wetland integrated with microbial fuel cells will be also used. The prototypes performances will be evaluated following Life Cycle Assessment (LCA) and Life Cycle Costing (LCC) principles.

Furtheremore, the project will also involve stakeholders, local authorities, training and dissemination activities along the 4 years to guarantee that the developed technology and knowledge acquired impacts Indian society.

EU partners	**Indian Partners**
1. ttz Bremerhaven (Germany) 2. Aarhus University (Denmark) 3. Helmholtz Centre for Environmental Research (Germany) 4. Universitat Politecnica de Catalunya (UPC, Spain) 5. AIMEN Technologic Center (Spain) 6. University of Natural Resources and Life Sciences (BOKU, Austria) 7. BioAzul S.L. (Spain) 8. IRIDRA S.R.L. (Italy) 9. AUTARCON (Germany) 10. Kre_Ta - Rainwater use & Landscape design (Germany) 11. Seecon International Gmbh (Switzerland) 12. Pessl Instruments (Austria)	1. Aligarh Muslim University (Aligarh) 2. National Institute of Urban Affairs (New Delhi) 3. Indian School of Mines, Dhanbad (Dhanbad) 4. Symbiosis International, Deemed University (Pune) 5. Ecosan Services Foundation (Pune) 6. Mahatma Phule Krishi Vidyapeeth (Pune) 7. All India Institute of Local Self Government (Mumbai) 8. Lars Enviro Pvt. Ltd (Nagpur) 9. UrbanPlan Consulting & Engineering Pvt. Ltd. (Aligarh)

PAVITR EU and Indian partners

PAVITR Kick of Meeting, New Delhi 14th-15th February

The PAVITR Kick of Meeting was hosted at the National Institute of Immunology (NII) of New Delhi the 14th and 15th of February 2019. A joint meeting, in which all the 7 selected projects (PAVITR, LOTUS, PANIWATER, INDIA H2O, PAVITRGANGA, SARASWATI 2.0, and SPRING) of the new India-EU Water Projects on Research and Innovation call were present.

The first day all the projects were presented to an audience that included members of the Indian Department of Science and Technology (DST), Department of Biotechnology (DBT), and govt. of India and European Commission (EC - Executive Agency for Small and Medium-sized Enterprises and DG RTD), i.e. the member of Project Management. The project presentations included the introduction of Consortia Members, objectives,

technologies to be adopted, role and contributions of EU and Indian Members, beneficiary details and expected outcome.

The second day started with a morning parallel sessions, one for the Indian and EU Project Management (DST, DBT, EC) and one for each funded project. Particularly, the parallel session of funded project aimed to identify key actions to be set in response to Project Management recommendations. The results of the parallel meeting were presented in the afternoon, in which the key actions agreed by the funded projects were exposed to the Project Management.

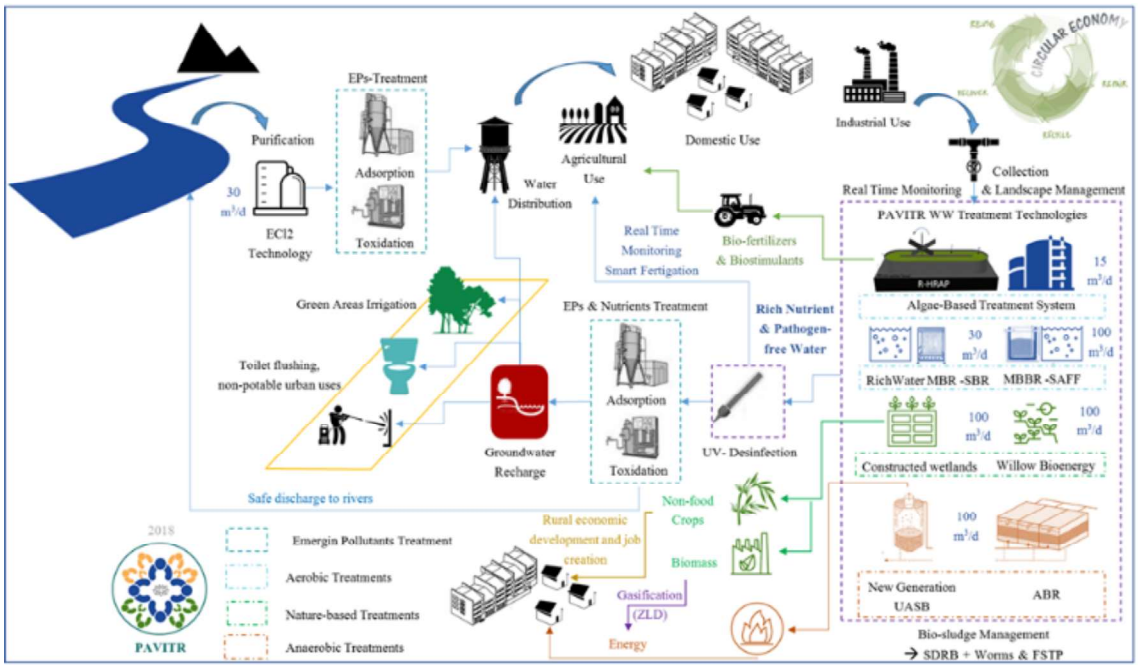

Figure 1: PAVITR circular economy approach

During the KoM some of the PAVITR social media activities were launched: facebook (https://www.facebook.com/PAVITR.H2020/) and LinkedIN (https://www.linkedin.com/company/pavitr/) pages were opened and followed on stage activities of the KoM meeting. We invite you to follow the PAVITR social media to see more pictures from the KoM and to be updated on upcoming project activities.