Research in Action: Using crustaceans to treat wastewater

More than two billion people worldwide have no access to clean water, largely because over 80% of wastewater returns to the environment untreated. In LMICs, inadequately purified water exposes individuals, especially children, to preventable health risks and deaths.

Researchers from the IGI-IAS pioneered an innovative biological platform that uses an active filter feeder, a harmless crustacean, to remove both dissolved chemicals and suspended matter from water, reducing water-borne diseases and enabling water reuse. In lab conditions the treatment improves water quality significantly, removing up to 99% of chemical mixtures, including highly persistent compounds.

This prototype Daphnia-algae bioreactor has been tested in laboratory settings to develop a model that will help identify the optimal Daphnia intensity in different environmental conditions, allowing for a constant population.

Due to its low demands on energy and infrastructure, the platform is especially suitable for countries with poor infrastructure, so the team looked to deliver solutions for the application of the biological platform in LMICs with an initial focus on Vietnam and Nigeria, thanks to funding from the Global Challenges Research Fund and the Petroleum Technology Development Fund (Nigeria).

Through further awards from NERC and Innovate UK, the team are building on their early successes to expand the research into Brazil, conduct additional feasibility studies, and undertake an initial market assessment with a view to commercialising the treatment system.

The aim is to implement the biotechnology and upskill the local work force, leading to sustainable benefits to communities and cleaner, safer water for all.

"We wanted our science to help with one of the most pressing issues in modern society: water reuse. We were pleased that our partners showed such a deep understanding of the problem and a forward looking attitude to solving it."

Lead Researcher, Dr Luisa Orsini