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SUCCESS STORY

Pakistan-U.S. Female Scientist Team Works To Improve Health of Pakistan's Rivers

Two women led the first water assessment for industrial discharge chemicals in rural Pakistan

"The long-term goal of this study is to aid in the design of a National River cleaning strategy for Pakistan and identify future research priorities." – Dr. Linda Lee

Triggered by local complaints of reduced water quality and mysterious fish kills, two women led the first study of Pakistan's surface water for long-lasting chemicals and their effects on aquatic life and rural communities.

Endocrine disrupting chemicals (EDCs) exist in industrial waste that is discharged into waterways. These chemicals are harmful to the hormone systems of both humans and animals, causing major health and environmental impacts. Dr. Bushra Khan, Associate Professor of Environmental Chemistry at University of Peshawar in Pakistan, and Dr. Linda Lee, Professor and Associate Department Head of Agronomy at Purdue University, USA, led a team of researchers to map these chemicals in Pakistan's Swat and Kabul Rivers and identify their impacts. The team is supported by the Pakistan-U.S. Science and Technology Cooperation Program, funded by USAID, the U.S. Department of State, and the Higher Education Commission of Pakistan (HEC), and implemented by the U.S. National Academy of Sciences, Engineering, and Medicine and HEC.

The project provided training to Pakistani and American students in assessing water and fish health and directly involved local communities. The researchers interviewed and surveyed local fisheries in Pashto and Urdu about the impacts of these chemicals on their production. Results of 25 interviews concluded that households continue to rely heavily on the water system for irrigation, fishing, tourism, and domestic supply, and decreasing water quality and quantity are driving the need to adapt. Respondents reported diversifying their livelihoods, changing their water source, and increasing their agricultural inputs in response. Further, high concentrations of a group of EDCs known as phthalates, which can originate from solid waste, were measured in river sediments. These chemicals, combined with the presence of microplastics are suspected to contribute to declines in fish population size and fish health.

This project contributes to wider studies of chemicals of emerging concern in South Asia. EDCs can have multi-generational effects on the ability of many animals to reproduce. With this study, US and Pakistan researchers are helping improve the health of rivers, wildlife and rural communities in Pakistan. Ultimately, the team aims to provide recommendations to reduce the impact of EDCs on river health for use by policymakers, researchers and regulatory agencies in both the US and Pakistan.