Urban-Water Nexus: Risk Based Assessment and Management of Water Quality Relating to Urban Flooding in the Pahang River Basin, Malaysia

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In recent years the Pahang river basin has experienced devastating floods causing loss of lives and destroying agricultural fields and infrastructure. Recurrent floods have threatened the quality of the Pahang river water, which is used by over one and a half million people for drinking and domestic use. The local communities do not participate in water management programs. However, more engagement from all stakeholders could support the long-term success of water management programs, and ensure that the Pahang river continues to provide clean water to the local communities.

Boats on muddy water in the Pahang river. Photo: iStock

Objectives

The goal of the study was to assess the risk of urban water contamination in the Pahang river basin, to identify existing and potential water management practices, and to recommend strategies to decrease the risk of contamination.

Approach

Water quality data from 2006 to 2016 was kindly provided by the Department of Environment and the Malaysian Meteorological Department, and data for 2017 was obtained as part of the study. Surveys with communities living in flood-prone areas explored water management practices. Interviews with non-governmental organizations and local stakeholders focused on potential strategies for risk reduction.

Results Overview

Water quality parameters were within the range of recommended values for Malaysian raw water. The study did not identify any carcinogenic or non-carcinogenic risks linked to the components found in the water. However, the research also highlighted a significant correlation between the climatic variables and the water quality.

The surveys found that the local population is aware of the importance of water quality and willing to participate in water management programs.

Interviews with stakeholders from the government, non-governmental organizations, the private sector and the university highlighted several recommended risk reduction measures and strategies, including improving irrigation and drainage systems, increasing community engagement and organizing river cleanup programs.

Conclusion

The findings suggest that the Pahang river water is safe for drinking and domestic use. However, there is a risk that the water quality will decrease with future changes in climate. The local communities, although interested in water quality issues, have not been engaged in water management programs up to now - an increased involvement of the communities, including through education and awareness raising programs, is recommended. As a first step in this direction, a pamphlet and a quiz competition have been developed to raise awareness about water quality and actions that everyone can take to reduce water pollution.

The journey continues...

A similar study has been conducted in the Langat river basin, Malaysia, considered a highly polluted area due to rapid urbanization. The objective of this study was to determine the status of contaminants in the water of the Langat river basin, to estimate potential health risks associated with drinking water contamination and to recommend the best drinking water management practice.

Lubna Alam has also been awarded a Fellowship by TWAS (The World Academy of Sciences), a world renowned organization based in Italy to conduct research on exploring links between water and health in South and South East Asia.

Lubna keeps in contact with other PARR fellows and her mentor, including through social media.

Dr. Lubna Alam is a Research Fellow at the Institute for Environment and Development (LESTARI) of the National University of Malaysia. She received her Ph.D. in Ocean Science from the National University of Malaysia, her Master's degree (MSc) in Marine Science from the same university and Bachelor's degree (BSc) in Fisheries from the University of Rajshahi, Bangladesh. Dr. Lubna has more than 10 years of experience in Environmental Science and is the author and co-author of over 60 peer-reviewed scientific publications, conference papers and book chapters.

Unpacked: A field researcher's essentials

By Lubna Alam

The **camera** is essential to capture the field trip activityies for reporting and preserving memories of the trip.

I am not used to try different kinds of food and thus I always bring **dry food** with me during surveys.

Tissues, wipes, hand sanitizer, and mosquito repellent: the basics for a field trip.

On my **laptop** I can prepare or edit questionnaires, leaflets, or other research materials on the go.

In remote areas sometimes pure water is not available, so I bring with me a **water bottle**.

Sometimes we need to print survey materials and questionnaires during the field trip and in remote areas printing facilities might not be available - a **portable printer** is thus very helpful.

A **notebook** and a **pen** are the most important tools during field work. I use them to write down the description of the study area, any opinions of respondents and any special remarks.

In case of power outages, I have with me a **torch light**.

Once during field work I could not charge my phone because my charger and the plug did not match. I could not reach my family for 2 days! Since then, I always bring with me a **universal adapter**.

A **power bank** is useful to charge our mobile phone if we experience problems with electricity in remote areas.

And also...

- a **water quality multi-parameter** to measure the quality of the water in the study area;
- an **umbrella** to protect us from rain or sunshine;
- a **mini projector** to use with fellow researchers or to show findings to the local population...