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Exploring stakeholder priorities regarding decentralized wastewater treatment in the Brantas river basin using Q-methodology

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Next to the challenges of paramount importance represented by water scarcity, food security, energy transition, and environmental protection issues, the obstacles faced on the matter of water, sanitation, and hygiene (WASH) are immense. WASH interventions are essential to support human health, prosperity, and dignity, as they provide the base for an adequate standard of living. In many low- and middle- income countries, especially in rural and low-income areas, decentralized wastewater treatment systems (DEWATS) can offer a solution to convey, treat, and dispose of or reuse wastewater closer to the source and through smaller conveyance networks. In Indonesia, and as such in the Brantas basin on East Java, focus area of this study, the government has recognized DEWATS as their best available option for improving sanitation in dense low-income urban settings. Although the percentage of households with access to proper sanitation in the province of East Java has been increasing steadily, service coverage and the quality of sanitation systems still need to be increased to reach the desired coverage by 2024. Similar to other fields of application, within WASH and concerning DEWATS, stakeholders engagement, ethics and gender dimension are key topics to develop and strengthen integrated approaches. It is challenging to formulate targeted interventions in the watershed since they depend on the willing support of various stakeholders who may have different priorities (even within their own institutions), having diverse (and sometimes conflicting) viewpoints. This may result in stakeholders strongly contesting the appropriateness of various solutions. An exploration of stakeholder priorities is therefore needed to facilitate the application of wastewater treatment technologies. Due to its participatory approach and the type of interpretation that the method allows, Q-methodology was selected to explore this situation. Q-methodology is a set of techniques which allow for the study of 'subjectivity', combining statistics with the depth provided by qualitative data. It is composed of the data collection technique (called Q-sorting) and a data analysis step via correlation and factor analysis. In this contribution, we explore the perspectives and priorities of various stakeholders regarding decentralized wastewater treatment solutions to assess the applicability and acceptability of DEWATS in the Brantas river basin. This allows us to identify context-based criteria and challenges to the implementation of DEWATS in the Brantas watershed. As such, we propose the Q-methodology as a strong methodology to further develop the required transdisciplinary scientific efforts to promote relevant insights and solutions through meaningful, pertinent, and effective stakeholder engagement.