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Baseline Study of Water Quality in Indonesia Using Dynamic Methods and Technologies

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Abstract : Water quality in many Asian countries is very poor due to inefficient solid waste management, high population growth and the lack of sewage and purification systems for households and industry. A consortium of Indonesian and Dutch organizations has begun a large-scale international research project to evaluate and propose solutions to face the surface water pollution challenges in Brantas Basin, Indonesia (East Java: Malang / Surabaya). The first phase of the project consisted in a baseline study to assess the current status of surface water bodies and to determine the ambitions and strategies among local stakeholders. This study was conducted with high participatory / collaborative and knowledge sharing objectives. Several methods such as using mobile sensors (attached to boats or underwater drones), test strips and mobile apps, bio-monitoring (sediments), ecology scans using underwater cameras, or continuous / static measurements, were applied in different locations in the regions of the basin, at multiple locations within the water systems (e.g. spring, upstream / downstream of industry and urban areas, mouth of the Surabaya River, groundwater). Results gave an indication of (reference) values of basic water quality parameters such as turbidity, electrical conductivity, dissolved oxygen or nutrients (ammonium / nitrate). An important outcome was that collecting random samples may not be representative of a body of water, given that water quality parameters can vary widely in space (x, y, and depth) and time (day / night and seasonal). Innovative / dynamic monitoring methods (e.g. underwater drones, sensors on boats) can contribute to better understand the quality of the living environment (water, ecology, sediment) and factors that affect it. The field work activities, in particular, underwater drones, revealed potential as awareness actions as they attracted interest from locals and local press. This baseline study involved the cooperation with local managing organizations with Dutch partners, and their willingness to work together is important to ensure participatory actions and social awareness regarding the process of adaptation and strengthening of regulations, or for the construction of facilities such as sewage.

Keywords : water quality monitoring, pollution, underwater drones, social awareness
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