

## ABSTRACT

The contribution of citizen scientists to environmental monitoring is notably increasing significantly. Governments worldwide establish Water Users Associations (WUAs) as a good practice model to implement Integrated Water Resource Management (IWRM) at local levels. These associations target different stakeholders depending on the expected outcome. However, their effectiveness, especially in East Africa, can only be determined case by case. In Kenya, Water Resources Users Associations are registered, voluntary community groups whose members are water users and land owners. Similarly, in Uganda, community-based initiatives exist, especially along degraded rivers, involving cooperation between local communities and regional water authorities. On the contrary, it has been reported that in Tanzania, many community initiatives created become non-functional within 2–3 years of induction. In general, the main responsibility of Water Users Associations or its equivalent is to manage and conserve water resources for sustainable uses. In most cases, water quality monitoring by communities through citizen science is limited to the visual appearance of water in the river channel. While this can indicate the water's esthetic value, it is insufficient for assessing the ecological status of rivers, which is influenced by a variety of physical, chemical, biological, and socioeconomic factors. The use of bio indicators has been advocated as a feasible method for community-based water quality river monitoring. Therefore, this review explores the commonly used bio-indicators and bio-assessment tools for river health assessment and their complexities when using a bio monitoring community-based approach through citizen science. Tolerance and intolerance macro invertebrate and fish metric protocols that utilize identification keys have been recommended. These protocols are designed to be user-friendly and require minimal taxonomic expertise, making them easy for community volunteers to use with minimal basic training. The sustainability of these citizen science initiatives relies on the motivation of volunteers, the frequency of monitoring activities, and collaboration with researchers and government agencies. These initiatives not only facilitate environmental monitoring but also foster community engagement and awareness regarding the ecological status of rivers, thereby addressing knowledge and data gaps necessary for effective policy-making. This approach provides a practical model for environmental stewardship and participatory resource management in East Africa.