Citizen Science in Urban Water Resources Management: A Systematic Review of Terminologies and Global Applications

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Abstract The intensification of extreme climatic events in recent decades has posed new challenges to urban planning, particularly in contexts characterized by unequal access to water infrastructure and pronounced socio-environmental vulnerability. Within this scenario, citizen science has been employed as an instrument for generating territorially explicit data, integrating lay knowledge into decision-making processes concerning environmental resources. Although this approach has been adopted across various fields of knowledge, its deployment in urban water management remains diffuse and fragmented, with multiple definitions, methods, and forms of application. Such heterogeneity hampers comparative analysis between studies and constrains the incorporation of these practices into public policies aimed at urban water governance. This study undertakes a mixed systematic literature review to map the terminologies, foci, and applications of citizen science in urban water resources management, with an emphasis on connections to sustainable planning and to mitigation and adaptation strategies for climate change. The initial stage comprised an exploratory, qualitative approach to identify the diverse terms employed within the scientific literature. A scoping review focusing on environmental science articles in urban contexts was conducted, resulting in the identification of 42 terms associated with citizen science. These terms were subsequently used in cross-referenced searches in the Scopus and Web of Science databases, considering seven thematic centralities: water management, urban drainage, SDGs/Agenda 2030, urban management, Sustainability, Flooding, and Climate change. The PRISMA-ScR protocol was adopted to structure the processes of searching, filtering, selecting, and systematising data.The initial corpus consisted of 167,494 documents, which were reduced to 28,632 after refinement. The final screening, conducted with the aid of EndNote and Rayyan, resulted in an analytical set based on inclusion criteria related to the urban scale and participatory approach. The results reveal a recent expansion in scientific production on the topic, with particular emphasis on applications in flood monitoring, land use, water quality, and urban climatic mapping. Citizen science was identified as a supporting element in digital platforms, participatory remote sensing, and voluntary data collection. Methodological challenges were also observed, including data validation, continuity of actions, and institutional coordination. The systematic review confirms the structuring role of citizen science as a component of environmental urban planning strategies anchored in collaborative approaches.