Environmental Engineering and Management Journal

October 2025, Vol. 24, No. 10, 2219-2229
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu
http://doi.org/10.30638/eemj.2025.172

"Gheorghe Asachi" Technical University of Iasi, Romania

URBAN COMMUNITY GARDENS AS NATURE-BASED SOLUTIONS FOR WATER RESILIENCE IN CO-PRODUCTION. THE CASE OF BOLOGNA

Sara Rizzo[1]*, Giulia Lucertini[1], Alessandra Bonoli[2], Maria Elena Bini[2], Roberta Guzzinati[3], Luca Settanni[4], Francesca Cappellaro[5]

[1]IUAV University of Venice, Santa Croce, 191, 30135 Venezia, Italy
[2]Department of Civil, Chemical, Environmental and Materials Engineering, University of Bologna, via Umberto Terracini 28, 40131, Bologna, Italy
[3]ENEA Department SSPT - Division circular Economy - Laboratory of Technologies the Circular Management of Water and Wastewater, via dei Mille 21, 40121 Bologna
[4]Aquaponic Design Srl, via San Felice 26, 40122 Bologna, Italy
[5]ENEA Technology Transfer Directorate Knowledge Transfer Management Division Technology Transfer Tools Service, via dei Mille 21, 40121 Bologna

Abstract

In the context of increasing water scarcity, Urban Community Gardens (UCGs) are emerging as hotspots of the built environment, where efficient and sustainable water management practices can be tested and implemented. The paper's objective is to describe UCGs as examples of co-production in Nature-Based Solutions (NBS), focusing on the design and development of circular strategies for water reuse. The study explores six experimental case studies located in the metropolitan city of Bologna (Italy), a context where urban horticulture has long served as local welfare and is now evolving to host innovative solutions supporting environmental resilience. In addition, the paper highlights the implementation of social innovation pathways, community building, and citizen engagement. These co-production dynamics were enabled through co-design activities using open innovation approaches, particularly Urban Living Labs (ULLs), which facilitated the development and experimentation of locally adapted, do-it-yourself solutions. The analysis of the results reveals that the implemented solutions had a significant social and economic impact, demonstrating the effectiveness of UCGs as NBS in strengthening communities, contributing to the achievement of the 2030 Agenda SDGs for more sustainable and resilient cities, and validating the positive outcomes of a participatory, co-production-based approach.

Key words: circular water management, co-production, nature-based solutions, urban community gardens, urban living lab

Received: May, 2025; Revised final: November, 2024; Accepted: November, 2024; Published in final edited form: October, 2025

* Author to whom all correspondence should be addressed: e-mail: rachid.aboutayeb@inra.ma