



Environmental Benefits of Urban Food Hubs: A Life Cycle Assessment of Surplus Food Redistribution in Milan

Riccardo Guidetti^{1*}, Arianna Cusmai¹, Giulia Valentini², Andrea Rizzuni², Andrea Casson¹, Abhishek Dattu Narote¹, Giovanni Scotti², Alessio Tugnolo¹, Roberto Beghi¹, Valentina Giovenzana¹,

¹ Department of Agricultural and Environmental Sciences – Production, Landscape, Agroenergy (DiSAA), Università degli Studi di Milano, via Celoria 2, 20133, Milano, Italy

² Department of Management, Economics, and Industrial Engineering (DIG), Politecnico di Milano, Via Lambruschini 4/b, 20156, Milano, Italy

* Corresponding Author: riccardo.guidetti@unimi.it

Abstract. Urban food hubs for surplus food redistribution are a promising solution to mitigate food waste and its associated environmental impacts. However, their environmental sustainability remains underexplored. This study conducts a life cycle impact assessment of two food hubs in Milan, a leading city in implementing innovative food policies. The analysis reveals that a single food hub generates significant environmental benefits, including net yearly savings of 107 tons of CO_{2,eq.} and the recovery of around 140,000 meals. These efforts reduce the environmental burdens linked to excess food production and disposal, including greenhouse gas emissions, resource depletion, biodiversity loss, and pollution.

By diverting surplus food from waste streams, food hubs align with global sustainability goals, particularly SDG 12 (Responsible Consumption and Production) and Target 12.3, which seeks to halve global food waste by 2030. The findings also highlight the potential of food hubs to integrate environmental benefits into broader urban sustainability frameworks.

This study provides a structured approach to quantifying the environmental impacts of surplus food redistribution, offering actionable insights for policymakers, urban food actors, and nonprofit organizations. It strengthens the case for food hubs as key instruments in climate change mitigation, resource conservation, and sustainable food systems, emphasizing their transformative role in urban waste management and policy innovation.

Keywords: Surplus food redistribution; food waste mitigation; Environmental sustainability; Life cycle assessment.

