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Enabling Redistribution: Consumer-Level Innovations to Rescue Surplus Food

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Abstract

This systematic literature review examines recent innovations that facilitate surplus food redistribution at the consumption stage and evaluates their potential to address logistical, regulatory, social and technological barriers. Following PRISMA-guided searches across Google Scholar, ResearchGate and Scopus (2017–2026), 68 studies were retained. The review identifies three broad pathways for redistribution: traditional food-bank networks, digital food-sharing platforms (commercial B2C, philanthropic B2NGO and peer-to-peer P2P), and hybrid social-enterprise models that combine digital tools with dedicated logistics. Key findings show that digitalization — including AI, cloud computing, GPS matching engines and blockchain — improves supply–demand matching, traceability and real-time logistics, enabling faster collection of perishable surplus and automated quality checks. Platform models such as discounted “surprise-bag” B2C services and P2P sharing mobilize new actors and crowdsourced last-mile logistics, while B2NGO and hybrid social enterprises help reach vulnerable groups and provide institutional capacity. Life cycle assessment evidence indicates redistribution often yields meaningful environmental benefits when logistics are optimized. However, multiple persistent challenges limit large-scale impact. Operational uncertainties at food banks, spatial mismatches between supply and demand, legal and food-safety constraints, reputational concerns, and financial sustainability remain critical barriers. Advanced technologies raise equity concerns: algorithmic bias, digital exclusion and the risk that commercialization prioritizes paying consumers over those with greatest need. Several studies also warn of unintended consequences (e.g., increased packaging waste, or diversion from systemic solutions to food insecurity). The review concludes that technological innovations can shift redistribution from reactive waste management towards an integrated component of circular food systems — but only if coupled with enabling policy funding models that support under-resourced actors, targeted spatial strategies, capacity building within operations, and rigorous bias and safety audits. Future research should quantify comparative environmental and social outcomes across redistribution models, evaluate long-term platform continuance, and test policy–technology packages that prioritize equity while maximizing environmental gains.

Keywords: food redistribution, food waste prevention, applications

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