

ORIGINAL RESEARCH

A circular economy approach to food security and poverty in Sri Lanka: Systematic Review

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Abstract

Background: Sri Lanka faces food security and poverty challenges amplified by economic shocks, rising food prices, post-harvest losses, and waste. Circular economy (CE) strategies such as food rescue/redistribution, waste valorization, circular agriculture, and closed-loop food chains have been proposed to reduce waste, improve nutrient/food access, and generate livelihoods. This review synthesizes empirical and policy literature on CE interventions relevant to food security and poverty reduction in Sri Lanka. **Methods:** We searched PubMed, Scopus, CINAHL and ScienceDirect (plus selected policy reports and project summaries) up to 10 October 2025 for studies, reviews, and reports addressing circular economy strategies applied to food systems, food waste, and poverty/food security in Sri Lanka. Search terms combined “circular economy” OR “circular agriculture” OR “food rescue” OR “food waste” with “Sri Lanka”, and with outcome terms (“food security”, “poverty”, “livelihood”, “post-harvest losses”). Inclusion criteria: empirical studies, case studies, systematic or narrative reviews, policy reports, and project evaluations in the Sri Lankan context (or with explicit Sri Lanka case material) that discussed CE strategies with implications for food security or poverty. Exclusions: non-English items without an English abstract, purely theoretical CE papers not tied to food systems, or items outside the Sri Lankan context (unless they provided transferable evidence cited in Sri Lanka analyses). **Results:** From searches and snowballing of references, we identified key empirical studies and reports describing (a) surplus food redistribution/food rescue, (b) food waste re-use (including animal feed and insect-based bioconversion), (c) circular agriculture and resource recovery (composting, nutrient cycling), and (d) enabling policy and implementation challenges. A prominent case study on food rescue in Sri Lanka documented food redistribution initiatives and their effects on food access and livelihoods. Studies of food waste valorization (e.g., diverting waste to livestock feed; insect larvae systems) indicate technical feasibility and potential livelihood benefits, but highlight regulatory, food-safety and logistical barriers. National policy and projects show increasing institutional attention to CE principles, but implementation gaps remain. To address these issues, the study recommends using web platforms and smartphone apps to better match food donors with front-line organizations, thereby improving coordination and reducing food spoilage. **Conclusions:** The literature suggests CE approaches (food rescue, waste-to-feed, composting, circular agricultural practices) hold promise to reduce food loss, improve household food access, and create income-generating activities in Sri Lanka. However, evidence remains concentrated in case studies and small-scale projects; stronger empirical designs, attention to food safety, policy coordination, and scaled-up pilot-to-policy pathways are needed. Policy coherence, logistics, and EPR/market incentives are recurring barriers.

Keywords: Food Security, Circular Economy, Food Waste, Food Rescue, Circular Agriculture