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Building a Harmonised Food Waste Monitoring Model for Hospitality and Food Service Management: Considering Economic Impacts

Vesa Lampi and Eeva Lehtonen

Natural Resource Institute Finland (LUKE), Finland

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Abstract

This study stems from Natural Resource Institute Finland (LUKE) role as national food waste (FW) reduction coordinator. While FW environmental impacts and measuring are widely studied, less research has addressed FW economic impacts for food services (FS). Harmonised hospitality FW monitoring methodologies remain rare, too. LUKE research, however, has long pioneered this framework (e.g. Katajajuuri et al 2014, Silvennoinen et al 2015 & 2019). To continue, our study aims were to: 1) develop a robust FW management model for FS; and 2) observe how communicating FW reduction through profitability influences restaurant practises. We collected data by conducting FW monitoring pilots in eight vocational schools and 26 restaurants, twice through optimum two-week length (Kostensalo et al 2025). Participants recorded FW with a LUKE-created application (Lukeloki). One municipality donated a supplementary two-year, 100+ school FW dataset. Model development was supported by management and stakeholder discussions and feedback, and public statistics, during Finnish projects FW Ecosystem and Älykäs ruokahävikki haltuun (ERDF funding). Our comprehensive FW reduction approach combines costs into systematic FW monitoring, including people-oriented leadership, within one methodological framework. The model was plotted onto a matrix format, covering parameters such as: restaurant type; business scope; types and amounts of food served and wasted (edible & inedible), and by production stages; variable cost; location; monitoring timing; surplus redistribution; and people-oriented issues. Added visual instructions illustrate how to apply the model. Our piloting results indicate that following the harmonised model encouraged restaurant into more robust, profitable operations, and identified their prominent and effective FW reduction hotspots. Food category-based analyses revealed costly yet wasted menu items. We consulted each piloting management afterwards; they implied that communicating FW results in tangible and economic terms inspired staff into new FW reduction measures, or circular cooking practises. Along earlier LUKE findings (Kettunen et al 2025), empathetic leadership was suggested to remedy FW-induced behavioural concerns (negative emotions, working attitudes, etc.), in turn improving staff well-being and efficiency. Importantly, the study revealed room to improve in our model, especially when extrapolating measured FW data onto national estimates for Commission reporting. Our findings cover mainly buffet service, alas, limiting transferability into other restaurant environments. Nevertheless, the LUKE model appears to provide FS with a systematic framework for improving operational efficiency, guided by transparent and comparable FW data, while supporting restaurants' economic, environmental, and sociocultural sustainability.

Keywords: Food services, monitoring model, profitability, restaurant engagement

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