

The role of packaging in reducing food waste: Trade-offs and synergies in a globalized food sector

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Abstract

Food waste (FW) has become one of the top pressing issues today, with one-third of the total food produced for human consumption lost or wasted across the entire supply chain. Oversized packaging is an important factor attributing to this problem, which usually dominates legislative regulations due to the direct environmental impacts, associated to its production, transport and end-of-life treatments. However, indirect effects, i.e., those dependent on consumer behaviour, are usually overlooked, in spite of undertaken measures to reduce these impacts are usually more effective than those to limit the direct ones. In this context, the objective of this work is to analyse the influence of packaging attributes on FW, identifying actions and strategies by involving industry stakeholders, policy makers and consumer groups in order to avoid negative environmental impacts and promote a more sustainable food sector. A literature review demonstrated that the chief trouble resides in finding a food-to-packaging trade-off, since changing to single-serve formats may result in less FW, but in more packaging per serve, and vice versa. Based on this problem, measures can be addressed to reduce both the direct and indirect impacts of packaging, involving both producers and consumers in the process. The application of circular economy (CE) constitutes an essential opportunity for improvement by "closing the loop", implementing what is known as a cradle-to-cradle approach. In this line, eco-design or circular product design play a key role to support the transition to a CE by creating strategies for slow and close the loop of the technical and biological cycles. Enhancement actions include the use of low-impact resources, such as recycled, recyclable, biodegradable or compostable materials, reduction of product weight or volume, 'smart' design focused on facilitating the separation of different materials, or optimization of production, distribution, and end-of-life processes by trying to extend food shelf life. Finally, changing consumer behaviour is mandatory to modify environmental outcomes. Taking on a perspective of "think global, act local" to promote zero-kilometre trade presents a chance to achieve food security and avoid FW, as well as to reduce the amount of packaging by not requiring excessive product protection for transportation.

Keywords: Environmental impact, technical cycle, biological cycle, circular economy,

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