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with planetary health"

Recycling food waste for animal feed in South Asia: A systematic review of circular practices

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Abstract

South Asian countries (SAC) are facing significant challenges in waste governance and management, particularly regarding food waste (FW). The systematic integration of FW into livestock feeding systems presents a promising pathway to enhance nutrient cycling in line with the concept of the circular economy. This study investigates the potential of FW as feed in SAC through a systematic literature review by examining waste generation patterns, identifying barriers to its mainstreaming, and assessing the alignment of existing waste governance and management with circular economy principles. Studies were included if they focused on FW types, processing methods, revalorisation, life cycle assessments, circular economy models, legislation, incentives, and barriers to mainstreaming FW as feed, and were published in English as peer-reviewed articles, conference papers, theses, or relevant reports. The search in online databases covered the period between 2000 and 2025 and used fixed search terms; it resulted in a final number of 24 articles meeting the selection criteria. A thematic analysis was conducted to systematically identify and synthesize key patterns and trends across the existing literature using MAXQDA software. The review highlights that waste management continues to rely heavily on uncontrolled dumping and open burning, with limited application of composting, biogas generation, or informal reuse of FW as feed. Notably, urban and peri-urban animal keepers face several barriers to FW utilisation, including contamination with inorganic waste, lack of regulatory support, absence of nutritional evidence, and limited awareness of FW effects on animal production. Global restrictions on FW use as feed further complicate its local adoption. At the conceptual level, the absence of integrated frameworks and stakeholder engagement hinders the development of socially and culturally appropriate circular practices. At the governance level, weak regulation and poor institutional coordination constrain formal policy support. At the management level, insufficient empirical data on nutritional aspects and regional variability underscore the need for region-specific validation. Advancing from fragmented efforts to systemic change for FW recycling as feed will require a multidisciplinary, multi-stakeholder approach, integrating insights from food systems, animal science, waste management, and policy to build resilient and sustainable circular food systems in SAC and beyond.

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