Tropentag, September 16-18, 2026, hybrid conference

"Towards multi-functional agro-ecosystems
promoting climate resilient futures"

Sustainability hot spot analysis: A review of methods and case studies from Senegal and Kenya

Aicha Mechri[1], Katja Kehlenbeck[2], Silke Stöber[3], Elisha Otieno Gogo[4], Andre Diatta[5]

[1] *Humboldt Universität zu Berlin, Centre for Rural Development, Germany*
[2] *Humboldt Universität zu Berlin, Center for Rural Development (SLE), Germany*
[3] *Humboldt-Universität zu Berlin, Centre for Rural Development (SLE), Germany*
[4] *Pwani University, Crop Sciences, Kenya*
[5] *Gaston Berger University, Department of Agronomy, Senegal*

Abstract

The identification of sustainability hotspots along food value chains is a key step in designing interventions for sustainable food systems. However, existing sustainability assessment approaches are often fragmented, with limited integration of stakeholder perspectives and weak links between hotspot identification, solution development, and feasibility assessment. This paper reviews and advances methodological approaches for Sustainability Hot Spot Analysis (SHSA), framing it within a life cycle perspective that captures sustainability impacts across all stages of value chains, with a particular focus on producers.

The paper synthesizes core methodological components proposing an extension that integrates four elements: (i) identification of hotspots across the full life cycle of value chains, spanning social, economic, and environmental dimensions, (ii) structured sustainability assessment using context-specific indicators, (iii) co-development of solution pathways with stakeholders, and (iv) evaluation of the feasibility of these solutions, particularly at the producer level.

The framework follows a stepwise approach, including scoping, life cycle mapping, hotspot identification, participatory assessment, prioritisation, and solution appraisal. Its applicability is illustrated through field testing in Senegal (tomato, mango, and onion value chains in coastal areas) and in Kenya (amaranth and mango value chains in Kilifi County). Empirical applications demonstrate how the integration of life cycle thinking with participatory methods enables the identification of sustainability constraints faced by producers and supports the development of context-specific responses.

The results indicate that even though sustainability hotspots frequently emerge at the production stage, they remain closely linked to dynamics along the the value chain. These hotspots often span multiple sustainability dimensions and are interdependent, requiring integrated and context-sensitive positioning. The inclusion of feasibility assessment, encompassing economic viability, social acceptance, and institutional conditions proves essential for translating analytical findings into actionable strategies. The approach aligns with agroecological principles and contributes to identifying leverage points for transformative change in food systems.

Contact Address: Aicha Mechri, Humboldt Universität zu Berlin, Centre for Rural Development, Robert-Koch Platz 4, 10115 Berlin, Germany, e-mail: aicha.mechri@hu-berlin.de

Overall, this ex-post method review contributes a practical and adaptable SHSA framework that links life cycle–based sustainability assessment with participatory solution design and feasibility evaluation. By focusing on producers while retaining a value chain perspective, it provides a pathway for researchers and practitioners seeking to support context-specific and implementation-oriented improvements in food systems.

Keywords: Agroecology, food value chains, kenya, participatory methods, senegal, sustainability hot spot analysis