



Tropentag, September 11-13, 2024, hybrid conference

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Assessing Africa’s environmental footprints: Unveiling cattle production variations across regions

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Abstract

The livestock industry in Africa has experienced significant expansion due to increased demand for meat, dairy, and associated products. Nevertheless, while striving to meet the increasing demand for meat and milk, African livestock production systems generate significant environmental impacts mainly due to their relatively low productivity. Several research initiatives have assessed the greenhouse gas (GHG) emission intensities, soil impacts, water consumption, and land usage of various livestock systems across multiple regions in Africa. Despite advancements, there are still gaps in the understanding of regional variation of GHG emissions, water footprint, land footprint, and their implications for livestock production systems in Africa, particularly when assessed in terms of intensity per unit product. These gaps are evident in the notable lack of comprehensive studies that consolidate all environmental footprints from the African cattle production sector. This study seeks to review the existing evidence of cattle production characteristics in various environmental domains, including GHG emissions, water usage, land use, soil degradation, and nitrogen balance. Input data collected from existing literature spanning from 2003 to 2023 divides Africa into five regions: Northern, Eastern, Western, Central, and Southern Africa. The analysis categorises the production systems of cattle into three types: intensive, semi-intensive, and extensive systems. Six bibliographic databases namely Science Direct, PubMed, Web of Science, Dimensions Research Scholar, Semantic, and Research Gate were accessed. 112 publications were selected from a pool of 158 papers retrieved, after screening titles and abstracts. The findings indicate that cattle systems in Africa exhibit a notably higher environmental impact from meat and milk production compared to both global and continental levels. This exerts significant pressure on environmental resources, potentially leading to long-term risks. Significantly, Southern Africa demonstrates superior performance compared to other regions on the continent. However, persistent challenges such as low feed quality and availability, lack of specialisation, and reliance on low-productive breeds remain. Implementing locally tailored measures is essential to address these issues.

Keywords: Cattle, GHG emission, land footprint, productivity, regions, water footprint