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EDITED AND REVIEWED BY

Isabel Sousa,
University of Lisbon, Portugal

*CORRESPONDENCE

Nomali Ziphorah Ngobese,
✉ nomalingobese@gmail.com

RECEIVED 27 May 2026

ACCEPTED 02 June 2026

PUBLISHED 19 June 2026

CITATION

Ngobese NZ, Sharma S, Muzangwa L and
Sharma N (2026) Editorial: Diversification
of food systems through cultivation of
potential underutilized fruits under
changing climatic scenarios.
Front. Food Sci. Technol. 6:1892391.
doi: 10.3389/frfst.2026.1892391

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Editorial: Diversification of food systems through cultivation of potential underutilized fruits under changing climatic scenarios

Nomali Ziphorah Ngobese^{1*}, Sunny Sharma², Lindah Muzangwa³
and Neha Sharma²

¹Unit for Environmental Sciences and Management, Faculty of Natural and Agricultural Sciences, North-West University, Potchefstroom, South Africa, ²Lovely Professional University, Phagwara, India, ³Royal Agricultural University, Cirencester, United Kingdom

KEYWORDS

agrobiodiversity, climate-resilient agriculture, food systems diversification, indigenous crops, sustainable food systems, underutilized fruits

Editorial on the Research Topic

Diversification of food systems through cultivation of potential underutilized fruits under changing climatic scenarios

The increasing impacts of climate change on agriculture continue to expose the vulnerability of production systems dependent on a limited number of globally dominant crops. Rising temperatures, erratic rainfall patterns, biodiversity loss, environmental degradation, and increasing food insecurity have intensified the need for resilient and sustainable agricultural alternatives. Within this context, underutilized fruit species are attracting scientific and policy attention due to their adaptability to harsh environmental conditions, nutritional richness, and potential contribution to diversified and climate-resilient food systems. This Research Topic was developed to explore the role of neglected and underutilized fruit species in strengthening sustainable agriculture, nutrition security, agrobiodiversity and resilient livelihoods under changing climatic conditions. The Research Topic brings together studies that highlight the scientific, agronomic, nutritional, and socio-economic importance of underutilized fruits and indigenous crops. Importantly, the contributions demonstrate that these crops are not merely niche or traditional food resources, but strategic components of future climate adaptation and food systems diversification efforts.

A notable contribution within this Research Topic is the original research article by [Mangezi et al.](#), titled “Improving germination and early seedling growth of marula (*Sclerocarya birrea* (A. Rich.) Hochst.) through hydro-priming.” The study addresses one of the major challenges limiting the wider cultivation and domestication of indigenous fruit species: poor germination and inconsistent seedling establishment. By investigating hydro-priming techniques to improve germination performance and early seedling vigor in marula, the authors provide insights that may support the propagation and commercialization of this ecologically and economically important

indigenous fruit tree. Given the significance of marula within southern African communities, the study contributes toward strengthening the cultivation potential of climate-resilient indigenous fruit species under challenging environmental conditions.

Similarly, the study by [Mfini et al.](#), titled “Optimization of production strategies for African indigenous trees: a case study of tree growers and sellers of *Dovyalis caffra* (Kei apple) from Eastern Cape of South Africa,” further emphasizes the importance of indigenous fruit trees within climate-resilient agricultural systems. The article highlights the relevance of *Dovyalis caffra* as a resilient indigenous fruit species capable of contributing toward food security, livelihood development, and adaptation within vulnerable communities in southern Africa. By examining production practices, indigenous knowledge systems, and market participation among growers and sellers, the authors demonstrate the importance of strengthening cultivation strategies, commercialization pathways, and value-chain integration for indigenous fruit species.

Another contribution is the review article by [Olawejaju et al.](#), titled “Harnessing postharvest innovation for indigenous crops to advance nutrition and climate resilience in sub-Saharan Africa.” In this article, the authors explore the role of postharvest technologies, processing innovations, and value-addition strategies in improving the contribution of indigenous crops to food and nutrition security. The review highlights how postharvest losses continue to undermine agricultural productivity, profitability, and food availability across many African food systems. By examining innovations capable of improving storage, processing, shelf life, and nutritional retention, the authors demonstrate that successful integration of indigenous and underutilized crops into modern food systems requires improved cultivation strategies together with postharvest systems and value chains.

An additional contribution enriching this Research Topic is the review article by [Raffaelli and Chawla](#), titled “Phytochemical profiling of secondary metabolites across botanical parts of underutilized berry species: antioxidant properties and climate-resilient value chains.” The review reinforces the growing recognition that indigenous and underutilized food resources possess substantial potential to strengthen nutrition security, climate resilience, and sustainable food systems transformation. By examining the phytochemical composition and antioxidant properties of underutilized berry species, the authors highlight the nutritional and functional significance of these crops while also drawing attention to their potential role in developing climate-resilient value chains.

Collectively, the articles published within this Research Topic reinforce several themes emerging within contemporary food systems discourse. First, they demonstrate that underutilized fruits and indigenous crops possess substantial potential for supporting climate adaptation due to their resilience under drought-prone, low-input, and environmentally stressed conditions. Many of these species have historically survived in marginal environments and continue to demonstrate adaptive traits that may become increasingly relevant as climatic variability

intensifies. Second, the Research Topic highlights the importance of strengthening propagation systems, postharvest handling, value-addition processes, and commercialization pathways if underutilized crops are to move from localized production systems into wider agricultural and commercial landscapes. The studies collectively demonstrate that improving food systems resilience requires attention not only to crop production, but also to storage, processing, seed systems, market integration, and sustainable value-chain development. The contributions further reinforce the importance of agricultural diversification as a pathway toward sustainable and resilient food systems. Modern agriculture remains heavily dependent on a narrow range of globally dominant crops, creating ecological and economic vulnerabilities under climate change. Diversification through underutilized fruits and indigenous crops may contribute toward strengthening agrobiodiversity, improving dietary diversity, reducing dependence on vulnerable monoculture systems, and supporting more locally adapted agricultural systems. Another strength of this Research Topic is its recognition of the socio-economic and cultural significance of indigenous crops. Many underutilized fruit species continue to support rural livelihoods, local food traditions, indigenous knowledge systems, and community resilience despite receiving limited institutional support and research investment. Importantly, this Research Topic also highlights the need for integrated and interdisciplinary approaches to food systems transformation. Addressing climate change and food insecurity requires more than increasing production alone. It also requires strengthening seed systems, improving propagation techniques, reducing postharvest losses, developing sustainable value chains, and creating enabling policy environments that support diverse and locally adapted crops.

As guest editors, we believe that the articles published in this Research Topic make a valuable contribution to scholarship focused on climate resilience, agrobiodiversity, and sustainable food systems diversification. The studies provide important scientific insights while simultaneously identifying practical pathways for strengthening the cultivation, utilization, and commercialization of underutilized fruits and indigenous crops under changing climatic scenarios. We hope that this Research Topic stimulates further interdisciplinary research, innovation, and policy engagement surrounding neglected and underutilized fruit species. Ultimately, the studies presented in this Research Topic remind us that some of the most promising pathways toward resilient and sustainable food systems may already exist within the biological diversity that global agriculture has historically overlooked.

Author contributions

NN: Conceptualization, Writing – original draft, Writing – review and editing. SS: Writing – review and editing. LM: Writing – review and editing. NS: Writing – review and editing.

Funding

The author(s) declared that financial support was not received for this work and/or its publication.

Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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