Tropentag, September 16-18, 2026, hybrid conference

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

Harnessing underutilised legumes for climate-resilient, nutrition-sensitive agroecosystems: The case of African yambean

Marshall Arebojie Azeke, Mary Ugunushe Eigbobo

Ambrose Alli University, Dept. of Biochemistry, Nigeria

Abstract

Underutilised legumes offer significant opportunities for building climate-resilient and multifunctional agroecosystems in the Global South. Among these species, the African yambean (*Sphenostylis stenocarpa*) stands out for its adaptability to marginal soils, dual-purpose (tuber and seed) productivity, and high-quality protein. Despite these advantages, its potential remains underexploited due to limited research investment, low farmer awareness, and processing constraints. This study synthesises over two decades of biochemical and processing research on African yambean, including improvements achieved through solid-state and lactic acid fermentation, as well as novel non-traditional methods that enhance nutritional value, reduce antinutritional factors, and improve functional properties essential for food applications.

The analysis evaluates African yambean's role within climate-smart agricultural systems, with emphasis on its contributions to soil fertility through biological nitrogen fixation, its suitability for intercropping designs that support biodiversity, and its resilience under increasing climatic stress. Evidence indicates that the crop's enhanced nutritional profile – particularly after fermentation – positions it as a viable component of nutrition-sensitive food systems aimed at addressing malnutrition and micronutrient deficiencies.

Furthermore, the study explores opportunities for integrating African yambean into local value chains through small-scale processing enterprises, improved seed systems, and policy incentives that support underutilised crops. These pathways align with the CGIAR Multifunctional Landscapes agenda by linking food production, soil health restoration, and livelihood diversification. The crop's versatility also supports circular bioeconomy approaches, including the use of processing residues for livestock feed.

Overall, African yambean emerges as a strategic crop capable of strengthening multifunctional agroecosystems, enhancing dietary diversity, and contributing to sustainable land-use transformation. The study concludes by recommending interdisciplinary research, participatory varietal development, and community-driven processing innovations to mainstream African yambean within climate-resilient agro-food systems.

Keywords: African yambean (*Sphenostylis stenocarpa*), climate-resilient agroecosystems, fermentation and food processing innovations, nutrition-sensitive food systems, underutilised legumes

Contact Address: Marshall Arebojie Azeke, Ambrose Alli University, Dept. of Biochemistry, Ekpoma, Nigeria, e-mail: azeke@aauekpoma.edu.ng