



A Perspective on the Socio-economic Impact of Indigenous Crops on Livelihoods: A Review

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ABSTRACT

The indigenous crop, also known as traditional crop or underutilized crop, is an enormous body of plant genetic resources previously practiced and worked to suit the particular local conditions by the indigenous population. The question remains that with all its potential, these crops have frequently been side lined in research, policy and market development by the internationally traded staple crops. The review uses the literature available to give a holistic approach to the various socio-economic effects of indigenous crops on livelihoods of people, especially in susceptible communities. Based on the review, it is possible to distinguish such key themes as improved food security and nutrition, improved by dietary diversification and resilience; improved income generation, achieved through niche markets, value addition and lower input expenses; safeguard of cultural heritage and traditional systems of knowledge; support of environmental sustainability and adaptation to climate change. Moreover, the paper identifies key issues that have significantly reduced the use and exploitation of indigenous crops, which include disintegrated value chains, inadequate research and development, non-existence of policies and loss of traditional knowledge. This paper has highlighted the importance of indigenous crops in creating resilient and sustainable livelihoods, supporting world food security and sustaining agrobiodiversity by reviewing available evidence. These results indicate that there is a burning necessity to conduct specific research, provide a supportive policy and interventions that would help to utilize all the potential of these valuable plant reserves.

Key words: Agrobiodiversity, Cultural significance, Food security, Income, Nutrition, Underutilized species.

The world's food systems stand at a critical juncture, characterized by a paradox of rising productivity and deepening vulnerability. Global agricultural output has expanded substantially, yet this growth is underpinned by an increasingly narrow genetic and commodity base, with a small group of staple crops, maize, wheat, rice and soy, dominating production, research investment and trade (Kumar *et al.*, 2025; Ndlovu *et al.*, 2024; Akinola *et al.*, 2020; Mabhaudhi *et al.*, 2022). In 2011, just three crops occupied around 40% of the world's arable land, a pattern that has persisted and intensified with green revolution-style policies and input-driven intensification (Ndlovu *et al.*, 2024; Akinola *et al.*, 2020). This homogenization heightens exposure to climate shocks, undermines ecosystem services and contributes to monotonous diets linked to micronutrient deficiencies (Talucder *et al.*, 2024). Sub-Saharan Africa is particularly exposed; food and nutrition insecurity remain widespread despite productivity gains, while climate change and demographic pressure compound vulnerability for smallholder farmers (Koch *et al.*, 2021; Giller *et al.*, 2021). Recent crises have further revealed the fragility of current agri-food systems in the region (Ndlovu *et al.*, 2024).

In this landscape, a vital yet often overlooked resource persists in farmers' fields and cultural traditions: indigenous and neglected underutilized species (NUS). These encompass cereals, legumes, roots, vegetables and fruits that have co-evolved with local agro-ecosystems (Qwabe *et al.*, 2025; Sileshi *et al.*, 2023). Adapted to drought

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and low soil fertility, they constitute a living library of genetic diversity (Kaur and Sangha, 2025; Kalyan *et al.*, 2025; Vaishna *et al.*, 2025; Mabhaudhi *et al.*, 2022). Nevertheless, numerous species remain scientifically and politically

marginalized, excluded from formal research, seed systems and value chains (Ndlovu *et al.*, 2024; Talucder *et al.*, 2024). Despite evidence of their roles, knowledge gaps and policy neglect still limit their inclusion in mainstream food systems in sub-Saharan Africa (Mphande, 2025).

Production and consumption of these crops extend beyond agronomics; they form the core of rural livelihoods. Agronomically, they offer predictable harvests in marginal regions when staples fail, enhancing food availability (Koch *et al.*, 2021; Ndlovu *et al.*, 2024). Nutritionally, many are rich in micronutrients and fibre, increasing dietary diversity and addressing hidden hunger (Mgwenya *et al.*, 2025; Akinola *et al.*, 2020). Recent research on school feeding demonstrates that NUS can enhance nutrient adequacy at reduced cost (Proietti *et al.*, 2025). Economically, these species support income generation, with women-dominated markets reinforcing household cash flows (Qwabe *et al.*, 2025; Mabhaudhi *et al.*, 2022). Ecologically, they strengthen agrobiodiversity, sustain ecosystem functions and offer nature-based climate responses (Fajinmi *et al.*, 2025; Sileshi *et al.*, 2023). Culturally, they are woven into traditions and indigenous knowledge systems, strengthening food sovereignty (Lubisi *et al.*, 2025; Omotayo and Aremu, 2020).

The socio-economic effect of indigenous crops is therefore best understood as a web of complementary advantages linking livelihood resilience, ecological sustainability and cultural integrity. Nevertheless, despite increased scholarly interest, significant disciplinary, geographic and crop-type knowledge gaps persist regarding indigenous vegetables and other NUS in sub-Saharan Africa (Mphande, 2025; Ndlovu *et al.*, 2024; Talucder *et al.*, 2024). This necessitates a more integrated conception to shift from rhetorical support toward consistent, scalable strategies.

This paper presents a systematic review synthesizing evidence on the role of indigenous and underutilized species in socio-economic livelihoods across sub-Saharan Africa. Specifically, it aims to: (i) critically evaluate documented impacts on food security, nutrition, income, gendered livelihoods and ecosystem services; (ii) elucidate the mechanisms through which these crops enhance household and system-level resilience; and (iii) identify persistent knowledge gaps to inform policy and practice (Mphande, 2025). By integrating findings across diverse agro-ecological settings and crop groupings, including grains, legumes, vegetables, fruits and wild species, this review provides a robust evidence base for scientists, policymakers and development professionals. Section 2 outlines the methodological approach. Section 3 synthesizes evidence on livelihood contributions. Section 4 discusses cross-cutting mechanisms and barriers. Section 5 concludes with policy implications and research priorities, aligning with contemporary efforts to transform African agri-food systems toward greater diversity, equity and climate resilience (Talucder *et al.*, 2024; Leakey *et al.*, 2022).

Review design

This study is an analytical literature review, designed to critically evaluate and synthesize evidence on the socio-economic impacts of indigenous crops on livelihoods in sub-Saharan Africa. The analytical approach enables conceptual development and identification of patterns and mechanisms beyond descriptive summary.

Search strategy

A systematic search was conducted across Web of Science, Scopus, PubMed, Google Scholar and African Journals Online (AJOL) in December, 2025 without date restrictions. Search terms combined Boolean operators across three themes:

- **Indigenous crops:** 'Indigenous crop', 'traditional crop', 'neglected and underutilized species', 'NUS', 'orphan crop', 'African leafy vegetable', 'wild edible species'.
- **Geographic scope:** 'Sub-Saharan Africa', 'West Africa', 'East Africa', 'Southern Africa', 'Central Africa' and individual country names.
- **Livelihood outcomes:** 'livelihood', 'food security', 'nutrition', 'income', 'gender', 'ecosystem service', 'resilience', 'cultural value', 'indigenous knowledge'. Reference lists of key articles were manually screened.

Inclusion criteria

Studies were included if they: (i) examined indigenous or underutilized species; (ii) were conducted in sub-Saharan Africa; (iii) reported on livelihood dimensions (food security, nutrition, income, gender, ecosystem services, cultural value); (iv) were peer-reviewed articles, reviews, or technical reports; and (v) were in English. Studies focused solely on agronomics or conventional staples were excluded.

Analytical framework

The review was guided by the sustainable livelihoods framework, which conceptualizes indigenous crops as assets that, through various livelihood strategies (production, consumption, marketing, processing), generate outcomes including food security, income, cultural continuity and ecosystem services within specific vulnerability contexts and institutional environments. This framework provided analytical structure while allowing emergent themes to be identified inductively.

Data extraction and analysis

A standardized form captured: bibliographic data, study characteristics, empirical findings, mechanisms, contextual factors and knowledge gaps. Thematic analysis involved coding recurring concepts, grouping into analytical themes and synthesizing patterns across regions and crop types. Critical examination identified contradictions and informed conceptual propositions.

Limitations

Limitations include restriction to english-language publications and potential underrepresentation of indigenous knowledge not captured in peer-reviewed literature.

Socio-economic impacts of indigenous crops on livelihoods

Food security and nutrition

Underutilized indigenous crops play essential and yet poorly considered role in household food security and nutrition particularly in rural and low income contexts in Africa and Asia (Mgwenya *et al.*, 2025; Shelembe *et al.*, 2024). This diversification of food production by not relying on a few staple production ensures that the food system becomes more resilient to climatic shocks, pests, or market volatility (Msweli *et al.*, 2025; Porcuna-Ferrer *et al.*, 2024). Numerous native crops like sorghum, millets, Bambara groundnut, cowpea and African leafy vegetables are naturally drought resistant, they grow well on marginal soils and need fewer externalities to give reliable harvests when the conventional crops are becoming less productive to climate stress (Porcuna-Ferrer *et al.*, 2024).

These species are normally rich in micronutrients and bioactive substances, other than energy provision. It has been reviewed that neglected and indigenous vegetables and grains usually have a greater amount of iron, zinc, provitamin A, calcium and dietary fibre compared to major cereals and play a strong role in combating the hidden hunger in resource poor communities (Mphande, 2025; Ali, and Bhattacharjee, 2023). African indigenous vegetable projects with Kenya and value chain research in Tanzania experience show that by incorporating amaranth, cowpea leaves and other indigenous vegetables into local diets, considerable increases in vitamin and mineral intake of rural-based households will be achieved (John and Vicent, 2025). Evidence from South Africa and Nigeria also suggests that a more diverse range of native vegetables and crops in the farm is related to higher scores on household dietary diversity and improved nutrition security (Tanimonure *et al.*, 2021).

The recent empirical research and studies affirm that the production and consumption of indigenous crops is positively related to the household food security status. Households that used more indigenous crops and sold them via structured systems in KwaZulu Natal, South Africa were much more likely to be food secure despite accounting for income and demographic variables (Shelembe *et al.*, 2024). Surveys of indigenous and traditional food crops in Africa also help emphasize their use in stabilizing food supply in lean seasons, cushioning poor families against market driven food price and providing culturally acceptable food (Mgwenya *et al.*, 2025; Akinola *et al.*, 2020).

On the other hand, the fact that the nutritional benefits are not well understood by the consumers, the fragility of the value chains and the stigma that the foods are still referred to as the crop of the poor people still limits their full potential towards food and nutrition security and so necessitating the provision of nutrition education, enabling policies and market development (Mphande, 2025).

Income and economic opportunities

Although large-scale commercial markets are dominated by major staples, indigenous crops have great potential in terms of income especially to smallholders and women. African reviews indicate that sales of indigenous vegetables and other traditional crops may be a substantial addition to the household cash income and rural livelihood (Mutetwa *et al.*, 2025; Onomu *et al.*, 2023). The rural women are the prime producers and traders of African leafy vegetables and other indigenous foods in South Africa and other countries, which frequently form more than a quarter of the household income in their sale (Onomu *et al.*, 2023).

Nutrient-dense superfoods and culturally specific products like teff, baobab, sorghum, millets and African leafy vegetables are growing niche markets both domestically and internationally, thus becoming able to charge higher prices and to differentiate their products (John and Vicent, 2025). Ethiopian consumer research has shown that Ethiopians highly favor processed products with native crops like teff, which leaves considerable potential to commercialize and develop the value-chain (Ochieng and Cho, 2023). Local crops are often cultivated using low bought inputs because they are locally adjusted and resilient and it may convert into positive aspects of profit margins to resource-poor farmers (John and Vicent, 2025).

Processing, drying, milling, oil extraction, better packaging and branding are other value addition processes resulting in new jobs along the value chain and are particularly essential to women and the youth in rural regions (Onomu *et al.*, 2023; Kansiime *et al.*, 2021). In the instance of African indigenous vegetables, such as farmer-led systems of producing seeds in Tanzania have offered households consistent opportunities to diversify income, where the sale of seeds contributes more than half of the household income to the producers (Kansiime *et al.*, 2021). Indigenous crops can be developed into structured markets and better value chain to decrease dependency on one commodity, reimburse households against fluctuations in prices and increase resilience to the economy (John and Vicent, 2025).

Nonetheless, commercialization has been limited by poor market integration, poor processing and storage facilities, poor consumer consciousness and the prevailing belief that the indigenous foods are of low status or poor people food (John and Vicent, 2025). It is important to address these barriers using supportive policies, agribusiness training and promotion with a special focus on unlocking the economic potential of indigenous crops in all their aspects (Onomu *et al.*, 2023).

Cultural and social significance

Indigenous crops hold a close correspondence with cultural identity, heritage and social organization and define the way communities perceive food, land and belonging. Research reviews on African indigenous and traditional food crops indicate that such foods are symbolic of heritage

and group identification and foods are at the heart of customary diets, feast foods and ethnic cuisines (Nelson *et al.*, 2019). Ethnobotanical accounts also indicate how certain plants and foods of crop basis play a central role in rituals and ceremonies, e.g. festival rice cakes in coastal Odisha or the special plants used in mega festivals in Telangana, where particular species are used to commemorate auspicious occasions and also can be used to support collective memory and spirituality (Sheron and Rani, 2025). Similarly, the practice of harvest and shared meals in various Indigenous settings are also used as a repository of living values, cosmologies and social relationships (Phelu, 2025; Rizki and Asrani, 2025).

Development and exploitation of indigenous crops are supported by highly established systems of traditional knowledge including seed selection, locally adapted cultivar methods, pest and soil control, storage, processing and medicinal applications (Bisht *et al.*, 2025). It has been shown to be useful in land use sustainability, food security and community resilience via such knowledge that is transmitted orally, through practice, women are often the most important custodians (Mbelebele *et al.*, 2024; Akinola *et al.*, 2020). Preservation of indigenous crops consequently assists in protecting this biocultural maternal foundation which in itself is an essential livelihood and social resource (Salim *et al.*, 2023; Nelson *et al.*, 2019).

It is also indicated that erosion of native crop diversity is closely connected to the loss of related knowledge, languages and practices, undermined cultural heritage and social strength (Pearson *et al.*, 2021). All these losses are worsened by climate change, modernisation, policy marginalisation and changing food preferences which in turn precipitate increased demands to recognise, document and intergenerational transmission of Indigenous and local knowledge as the cornerstone of sustainable and culturally based food systems (Fernández Llamazares *et al.*, 2021).

Environmental sustainability and climate change adaptation

Native crops are naturally important to the sustainability of the environment since they are locally adapted and in many cases, they do well where other crops have performed poorly. Underused native plants like bambara groundnut, sorghum, pearl millet and cowpea are suitable in degraded soils in the southern parts of Africa and Nigeria and less fertilizer and pesticides are applied compared to large commercial crops (Nhamo *et al.*, 2022). Their development in marginal and semi-arid lands will ease congestion in prime agricultural lands and maximize the limited amount of water available and this will increase drought resistance and water-use efficiency (Sambo, 2014).

The support of native crops is a direct contribution to save agrobiodiversity, which is the foundation of resilient agroecosystems. Multi-species rich systems also extend functional redundancy, favor pollinators and natural enemies and enhance nutrient roles, soil fertility and water

management, including along with agroecological management like intercropping and agroforestry (Kokkini *et al.*, 2025; Zuza *et al.*, 2024). Agroforestry and home garden systems that incorporate native species in Ethiopia and Vietnam have been shown to provide improved ecosystem services and annual food supply and provide greater resistance to climate shocks (Gemechu, 2025; Yaregal and Sime, 2024).

Indigenous crops and their landraces are important genetic resources of the adaptation process in the context of climate changes. Locally adapted varieties usually possess drought-, heat-, poor-soil- and pest-tolerance-traits which are currently being harnessed by modern breeding, genomics and 'rewilding' methods to produce climate-resilient cultivars (Lazaridi *et al.*, 2024; Pathirana and Carimi, 2022; Razzaq *et al.*, 2021). On-site cultivation of these crops makes farming systems less susceptible to rising temperatures, random precipitation and scarcity of resources and preserves the genetic diversity required to enhance crops in the future (Lazaridi *et al.*, 2024; Zuza *et al.*, 2024).

Yet, biases in policy, market forces and the institutionalization in favor of exotic high-input crops are leading to the extinction of the native drought-resistant species in certain areas, which endangered climate stability over time (Sambo, 2014). We need to shift the research, extension and incentive systems to indigenous, diversity-based farming, as such, therefore, to sustainable and climate-resilient food systems (Gemechu, 2025; Ranjan *et al.*, 2024).

Challenges and barriers

While the recognized advantages of indigenous crops are clear, their broader integration into agricultural systems and food economies remains hindered by substantial obstacles. Key constraints include:

- ✓ **Limited research and development:** Compared to staple crops, indigenous species receive disproportionately less attention in areas like agronomic practices, genetic improvement, pest control strategies and post-harvest logistics.
- ✓ **Fragile seed distribution networks:** Informal seed-sharing mechanisms remain unstable, while formal systems frequently overlook native varieties, creating bottlenecks in obtaining reliable seeds.
- ✓ **Policy-driven market biases:** Agricultural frameworks, market incentives and governmental subsidies predominantly prioritize high-yield commercial crops, discouraging smallholder farmers from adopting indigenous alternatives.
- ✓ **Fragmented value chains and market access:** Inadequate processing infrastructure, underdeveloped transportation networks and limited access to competitive markets undermine the ability of local producers to profit from these crops.

- ✓ **Loss of traditional knowledge:** The diminishing transmission of traditional ecological knowledge jeopardizes critical skills in cultivation, preservation and utilization of indigenous plant species.
- ✓ **Sociocultural stigmatization:** Perceptions of these crops as 'subsistence-grade' or culturally outdated deter consumer demand, pushing communities toward imported or nutritionally inferior options.

The analysis revealed five core themes regarding the socio-economic impacts of indigenous crops on livelihoods in sub-Saharan Africa. Table 1 provides a synthesized summary of the evidence across these themes.

This review critically evaluated the documented impacts of indigenous and traditional food crops on livelihoods in sub-Saharan Africa, elucidated mechanisms of resilience enhancement and identified enduring knowledge gaps. The synthesized evidence confirms that these crops deliver multidimensional benefits; nutritional, economic, cultural and ecological, while revealing significant variations across regions and crop categories, as well as persistent structural barriers that condition these outcomes.

Multidimensional contributions

The growing body of research affirms that indigenous crops deliver multiple livelihood benefits when enabling conditions are present (Mgwenya *et al.*, 2025; Shelembe *et al.*, 2024). Micronutrient-rich species; Bambara groundnut, cowpea, amaranth and traditional leafy vegetables, enhance dietary diversity, buffer against seasonal hunger and function as safety nets during climate or market shocks (Akinola *et al.*, 2020). Quantitative studies associate consumption and commercialization with improved household food security and more stable incomes, particularly where farmers access formal markets (Mkhize *et al.*, 2025; John and Vicent, 2025).

Beyond nutrition and income, indigenous crops are embedded in biocultural food systems that sustain social cohesion and traditional ecological knowledge. African, Asian and Latin American food systems exhibit rich crop diversity, support rituals and customary institutions and preserve knowledge on seed selection, pest management and climate adaptation (Kom *et al.*, 2024; Malapane *et al.*, 2024). The IPCC recognizes that climate-resilient agriculture depends fundamentally on such knowledge systems (Porcuna-Ferrer *et al.*, 2024; Swiderska *et al.*, 2022). Locally adapted practices; intercropping, agroforestry, organic management, contribute to agrobiodiversity and ecosystem services, positioning indigenous crops as pillars of climate-smart agriculture (Leakey *et al.*, 2022).

Regional and crop-category comparisons

Addressing the first objective, the evidence reveals notable geographic patterns. In Southern Africa, research focuses on indigenous leafy vegetables and Bambara groundnut, demonstrating positive associations with household food

security and women's income generation through informal markets (Shelembe *et al.*, 2024; Mutetwa *et al.*, 2025). However, commercialization remains constrained by weak value chains and policy neglect, with crops largely absent from formal support programs (Qwabe *et al.*, 2025).

In East Africa, stronger market integration is evident. Teff in Ethiopia has achieved commercial success through value addition (Ochieng and Cho, 2023). In Tanzania, farmer-led seed systems for indigenous vegetables demonstrate that structured market access can generate substantial household income (Kansiime *et al.*, 2021). The Ethiopian highlands also illustrate that global crop cultivation need not displace local diversity where farmers maintain diverse portfolios, though poverty increasingly constrains this capacity (Rampersad *et al.*, 2023).

West African evidence emphasizes indigenous crops as climate adaptation strategies. Drought-tolerant sorghum and millets function as safety nets during climatic stress in Senegal, yet their cultivation declines due to policy biases favoring input-intensive commodities (Porcuna-Ferrer *et al.*, 2024). Nigerian research associates indigenous vegetable diversity with improved dietary diversity, though commercialization lags due to infrastructural constraints (Tanimonure *et al.*, 2021).

Crop-category comparisons reveal further differentiation. Indigenous leafy vegetables feature prominently across regions with well-documented nutritional benefits and women's involvement, yet face the strongest stigmatization and weakest research investment (Mphande, 2025). Grain legumes demonstrate superior drought tolerance and soil improvement but remain marginalized in seed systems (Nhamo *et al.*, 2022). Indigenous fruits show commercial potential through niche markets, yet value chains remain fragmented (Omotayo and Aremu, 2020).

Mechanisms of resilience enhancement

Addressing the second objective, four interconnected mechanisms underpin resilience. Biophysical adaptation; drought tolerance and low-input requirements, enables reliable production where conventional staples fail (Porcuna-Ferrer *et al.*, 2024). Nutritional insurance; higher micronutrient density, buffers against hidden hunger during lean seasons (Ali and Bhattacharjee, 2023). Economic diversification; through multiple market channels and reduced input costs, spreads risk and stabilizes income, particularly for women (John and Vicent, 2025). Socio-cultural buffering; embedding in knowledge systems and social networks, sustains adaptive capacity through intergenerational learning (Kom *et al.*, 2024; Galappaththi and Schlingmann, 2023).

Structural barriers and systemic limitations

Despite documented potential, systemic constraints persist: neglect of research and policy support; poor extension services; insufficient processing infrastructure; thin markets; gendered barriers to resources and rapid

Table 1: Synthesized evidence on socio-economic impacts of indigenous crops in Sub-Saharan Africa.

Theme	Key contributions	Mechanisms/pathways	Regional/crop examples	Supporting evidence
Food security and nutrition	- Enhances dietary diversity - Provides reliable harvests during stress - Addresses micronutrient deficiencies (hidden hunger) - Stabilizes food supply in lean seasons - Generates household cash income - Creates employment along value chains - Enables market differentiation (niche markets) - Reduces input costs (profit margins) - Preserves cultural identity and heritage - Maintains indigenous knowledge systems - Supports social cohesion through rituals and shared meals - Strengthens food sovereignty - Enhances agrobiodiversity - Provides drought and heat tolerance - Improves soil health and water-use efficiency - Supports ecosystem services (pollination, carbon sequestration) - Limited research investment - Weak seed systems - Policy neglect and market biases - Post-harvest losses - Loss of traditional knowledge - Stigmatization as "poor people's food"	- Drought tolerance and adaptation to marginal soils - Higher micronutrient density (iron, zinc, provitamin A, calcium) - Low input requirements - Multiple harvest seasons - Sales in local, regional and niche markets - Value addition (processing, drying, milling, packaging) - Seed production and sales - Women-dominated trade networks	- Bambara groundnut (Southern Africa) - Sorghum and millets (Sahel) - African leafy vegetables (amaranth, cowpea leaves) in Kenya, Tanzania, South Africa - Cowpea (West Africa) - Indigenous vegetables (South Africa, Tanzania) - Teff (Ethiopia) - Baobab (Southern Africa) - Horned melon (Zimbabwe)	Mgwenya <i>et al.</i> (2025); Shlembe <i>et al.</i> (2024); Mphande (2025); Ali and Bhattacharjee (2023); John and Vicent (2025); Akinola <i>et al.</i> (2020)
Income and economic opportunities				Mutetwa <i>et al.</i> (2025); Onomu <i>et al.</i> (2023); John and Vicent (2025); Ochieng and Cho (2023); Kansiime <i>et al.</i> (2021)
Cultural and social significance		- Intergenerational knowledge transmission - Ritual and ceremonial use - Traditional ecological knowledge (seed selection, pest control, storage) - Women as knowledge custodians	- Festival rice cakes (Odisha, India) - Ritual plants (Telangana, India) - Indigenous food systems (Venda, South Africa) - Newar harvest rituals (Nepal)	Nelson <i>et al.</i> (2019); Sheron and Rani (2025); Phelu (2025); Mbelebele <i>et al.</i> (2024); Salim <i>et al.</i> (2023); Fernandez-Llamazares <i>et al.</i> (2021)
Environmental sustainability and climate adaptation		- Local adaptation to marginal conditions - Low fertilizer and pesticide requirements - Intercropping and agroforestry integration - Genetic resources for climate-resilient breeding	- Bambara groundnut (Southern Africa, Nigeria) - Pearl millet (Sahel) - Indigenous fruit trees (Ethiopia) - Home garden systems (Ethiopia)	Nhamo <i>et al.</i> (2022); Kokkin <i>et al.</i> (2025); Zuza <i>et al.</i> (2024); Gemechu (2025); Lazaridi <i>et al.</i> (2024); Pathirana and Carimi (2022); Sambo (2014)
Challenges and barriers		- Disproportionate focus on staple crops - Informal seed systems unstable - Subsidies favor high-input commodities - Inadequate processing infrastructure - Erosion of intergenerational knowledge transfer - Consumer perceptions and nutrition transition	- Across sub-Saharan Africa - Documented in South Africa, Tanzania, Nigeria, Ethiopia - Particularly acute for leafy vegetables and minor grains	Mphande (2025); Singh and Om (2025); Kompi and Nyetanyane (2025); Mbelebele <i>et al.</i> (2024); Porcuna-Ferrer <i>et al.</i> (2024); Rampersad <i>et al.</i> (2023)

loss of traditional knowledge (Singh and Om, 2025; Mbelebele *et al.*, 2024). These reflect deeper structural processes; colonial and post-colonial policy biases, nutrition transition and out-migration, that have systematically substituted drought-tolerant local products with input-hungry commodities, weakening long-term climate stability (Porcuna-Ferrer *et al.*, 2024). Even where diversity persists, poverty and structural inequalities constrain farmers' ability to maintain diverse portfolios (Rampersad *et al.*, 2023).

Knowledge gaps and methodological limitations

Addressing the third objective, the evidence base remains fragmented. Most research is cross-sectional; longitudinal studies tracking impacts over time are rare (Mgwenya *et al.*, 2025). Quantification of indirect effects; buffering against shocks, supporting ecosystem services, is underdeveloped (Woldyes and Gutata, 2025). Geographic coverage is uneven: Central and West Africa are understudied. Crop research disproportionately favors leafy vegetables and grain legumes over roots, tubers, fruits and wild species (Lubisi *et al.*, 2025; Sileshi *et al.*, 2023).

Implications for policy and practice

These findings carry clear implications. Mainstreaming indigenous crops in agricultural and nutrition strategies, research priorities and extension curricula is essential, aligning with climate, biodiversity and SDG frameworks (Malapane *et al.*, 2024; Swiderska *et al.*, 2022). Specific investments are urgently needed: decentralized processing, cold storage and logistics to reduce losses and enable value addition for smallholders and informal vendors (Mkhize and Cele, 2025). Market development must be accompanied by branding that counteracts stigmatization.

Equity considerations are paramount. Women are primary guardians of seed diversity and processing knowledge, yet face systemic restrictions in land access, finance and decision-making (Mbelebele *et al.*, 2024). Empowering women's agency and engaging Indigenous communities as partners in research and policy is essential to prevent marginalization and ensure cultural and ecological values are properly compensated (Melash *et al.*, 2023).

CONCLUSION

This review critically evaluated the documented impacts of indigenous and traditional food crops on livelihoods in sub-Saharan Africa, elucidated mechanisms of resilience enhancement and identified knowledge gaps to inform policy and practice. Indigenous crops boost food/nutrition security, women's income, cultural continuity and agrobiodiversity, but benefits vary by region and crop type. Resilience relies on drought tolerance, nutrient density, market diversification and generational knowledge. Yet structural barriers persist: colonial biases, underinvestment in R&D and value chains, weak extension services, gendered constraints and

knowledge loss. Solutions include integrating crops into national and climate plans, investing in decentralized infrastructure and empowering women and Indigenous communities as equal partners. Prioritizing indigenous crops is not conservation alone but a strategic investment in climate-resilient, equitable food systems.

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Disclaimers

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Informed consent

This is a review article based on published literature and does not involve any human or animal participants, therefore informed consent is not applicable.

Conflict of interest

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