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# The missing puzzle of indigenous crops in Tanzania's agricultural trade

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Existing trade policies in Tanzania can potentially boost or undermine Indigenous crop representation in both domestic and international trade. The trade potential is heavily reliant on the effectiveness of existing trade policies. This paper examines the existing trade policies related to indigenous crops in Tanzania, the challenges faced, and potential strategies to enhance their market integration and trade potential. It uses a mixed methods approach consisting of qualitative and quantitative trend analysis. A policy review process is used to assess the existing policies and their effectiveness in enhancing the trade potential of indigenous crops. The results suggest that existing policies do not sufficiently encompass indigenous crops and that the trade potential of indigenous crops still needs to be realized, with only three crops out of 28 (cassava, sorghum, cowpea) crops available in Tanzania having trade recognition in the international markets. Most indigenous crops remain in domestic markets, with very few reaching urban markets, while most remain in rural markets. Moreover, most of the policies and regulations available in Tanzania have yet to recognize these crops within the policies. This paper contributes to the development of policies that support the inclusion of indigenous crops in trade. It emphasizes the need for a comprehensive review of existing government policies to unlock the trade potential of indigenous crops, recognizing their critical role in Tanzania's agricultural heritage and food security.

KEYWORDS

**indigenous crops, trade potential, crop inclusion, policies, food security**

## Highlights

- Limited policy support for indigenous crops creates barriers to their trade, hindering their potential for food security and climate resilience.
- Research on indigenous crops, focusing on scalability, and market demand, is key to positioning them as premium products.
- A supportive policy environment, including subsidies and international partnerships, is essential for overcoming market barriers and promoting sustainable growth.

## 1 Introduction

The value of indigenous crops is underestimated despite their known benefits. Akinola et al. (2020) highlight that, despite their known benefits for food and nutritional security, indigenous crops remain marginalized in agriculture due to underinvestment in research and development. Promoting the trade of indigenous crop has many potential advantages, such as protecting biodiversity, supporting small scale farmers livelihoods, and improving food

security (Shelef et al., 2017). Indigenous crops, commonly known as orphan, forgotten or neglected crops, is a category of crops which are not traded globally in significant quantities, despite often playing a major role in supporting the diet and economy of local communities (Dwyer et al., 2022). Indigenous crops support a greater variety of plant species and are frequently well-adapted to regional climates and ecosystems, which contributes to the preservation of agricultural biodiversity. Indigenous crops, such as sorghum, millet, finger millet, amaranth, and various traditional vegetables, play a vital role in maintaining agricultural biodiversity, which is essential for ecosystem resilience and adaptability to climate change. This can lessen reliance on monocultures, which are more susceptible to pests and climate change, and increase the resilience of ecosystems.

The promotion of indigenous crops provides local farmers with opportunities to gain access to niche markets, allowing them to increase their incomes and sustain their livelihoods by giving them the chance to profit from specialized domestic and worldwide markets, which can enhance their standard of living and promote community growth (Johannes et al., 2016). Native crops improve food security and diversify diets while providing nutritional advantages, particularly in areas where food scarcity is a problem (Ravi et al., 2010). Furthermore, these crops are often more resilient to local climatic conditions and require fewer inputs than conventional cash crops, contributing to improved food security by diversifying diets and providing nutritional benefits. In Tanzania, indigenous crops are traditionally grown in various regions, showcasing rich agricultural heritage. Crops like sorghum and millet are particularly well-suited to arid and semi-arid environments, while finger millet and amaranth are valued for their high nutritional content and versatility in traditional dishes.

Given these advantages of indigenous crops, we argue that indigenous crops are the missing puzzle piece to key challenges in food and agricultural trade. Agricultural trading has been on major crops such as bananas, tea, coffee, maize, cassava, Beans, Potatoes, rice, Cashew Nuts, Tobacco, Cotton, Sisal, Sunflowers, and spices such as cloves (Mkuna, 2022). The majority of these crops are exotic, meaning they are non-traditional crops. Some if the indigenous crops include sorghum and millet but these commodities' production and trade volumes are at very low levels with trade being targeted at small domestic traders [Food and Agriculture Organization of the United Nations (FAO), 2021]. Tanzania holds a huge potential for tradition in indigenous crops, which are traditional crops from specific regions where they originate. Such crops include cassava, a major traded crop in Tanzania. Other crops include cowpea, pigeon pea, sorghum and millet, which have already had recognition in the agricultural export market. However, the missing puzzle is the underestimated trading potential in other major indigenous crops that have not reached the export market. Such crops include vegetables and fruits such as Bambara groundnut, baobab and sesame.

The agricultural sector is dominated by small-scale farmers cultivating various crops, such as maize and rice, with increasing technological advancement to transform the sector and make it more productive and sustainable. Some efforts include expanding agricultural trade, leveraging various advancements and strategic partnerships to enhance productivity and market reach. Such advancements include participation in the African Continental Free Trade Area (AfCFTA), which aims to remove tariffs on goods and promote free access to goods and services, which is expected to boost agricultural exports of African countries including Tanzania[1] [Food and Agriculture Organization of the United Nations (FAO), 2021]. Moreover, through bilateral agreements, the country has made efforts to enhance agricultural trade with Ethiopia, including cooperation in power generation, aviation, and joint market access for coffee and tea[2] (World Bank, 2018). This continuous effort to expand trade networks highlights Tanzania's commitment to leveraging its agricultural potential for economic growth.

Agriculture is the cornerstone of Tanzania's food system and economy, providing livelihoods for 75% of the population (National Bureau of Statistics (NBS), 2021; Ndimbo and Haulle, 2024). In urban and peri-urban areas, agri-food systems are crucial for low-income households, providing employment in cultivation, livestock keeping, and food vending (Kissoly, 2023). It has been instrumental in providing the population with employment, income, and food, evolving over the years. The sector contributes around 28% of Tanzania's Gross Domestic Product (GDP) (National Bureau of Statistics (NBS), 2021; Ndimbo and Haulle, 2024) and employs 65%–70% of the population, making it the main source of livelihoods for most Tanzanians (National Bureau of Statistics (NBS), 2021). There is still untapped potential of the agricultural sector through unexplored markets of neglected agricultural products.

To ensure sustainable trade, policies must balance economic growth with environmental conservation and equitable distribution of benefits. However, challenges exist, such as limited access to global markets for indigenous crops, the need for improved infrastructure, and the risk of commercialization overshadowing local consumption. Against this background, this paper reviews Tanzania's agricultural trade status to identify opportunities to include indigenous crops in the trading market and increase their market potential. The specific objective is to review the current status of agricultural trade in Tanzania and its limitations for indigenous crops. This paper identifies key opportunities for including indigenous crops in the agricultural trade in Tanzania providing evidence that is instrumental in the development of a framework for ensuring the inclusion of indigenous crops in trade policies. It recommends a holistic approach to increasing trade potential of indigenous crops which us initiated by a review of government policies to ensure the inclusion of IC and their promotion in international trading markets.

# 2 Methodology

## 2.1 Case description

Tanzania's agricultural trade landscape is shaped by a combination of domestic policies, regional agreements, and global market dynamics (Neema, 2024; Ouma, 2016). Despite the country's rich diversity of indigenous crops, their integration into both local and international trade remains limited. This study seeks to evaluate Tanzania's agricultural trade status, with a particular focus on identifying

1 https://www.tanzaniainvest.com/economy/trade/china-tanzania-nvestment-forum-2024

2 https://hiiraan.com/news4/2024/Mar/195292/tanzania_and_ethiopia_seal_trade_deals.aspx

opportunities to enhance the market presence of indigenous crops such as cassava, sorghum, and cowpea (Msuya and Isinika, 2020). By assessing existing policies and trade data, the study aims to uncover regulatory challenges, market gaps, and potential pathways for increased trade participation.

## 2.2 Collection of policy documents

A systematic search was conducted to collect publicly available national policy documents related to Agriculture (defined broadly to include crops and indigenous crops), and Trade (in relation to export and imports of crops) published between 2010 and 2025 ensuring relevance to the study's focus and recent policy developments. The search was performed using general search engines and key terms such as ["Agriculture" AND, "Trade and economy" AND "Industrial and Competitiveness" AND "indigenous crops" AND "Policy"]. The primary source for policy documents was Tanzania Revenue Authority (TRA), the Ministry of Agriculture, the United Nations Comtrade database, and the Food and Agriculture Organization (FAO). Where relevant policies were not found in these repositories, official national ministerial websites particularly those related to agriculture, trade, health, or economic development were systematically reviewed.

Key policy documents included national agricultural trade policies, regional trade agreements, and relevant international frameworks (United Republic of Tanzania, 1999, 2006, 2008, 2017, n.d.; Ministry of Agriculture, 2013; Southern African Development Community (SADC), 2014). The selection of these documents was guided by their relevance to trade regulations, market access, and agricultural development policies. Additional documents were retrieved from government portals and other reputable policy repositories to ensure comprehensive coverage. Textual analysis was employed to examine key themes, keywords, and policy narratives within the collected documents. This approach helped ensure rigor in assessing the policy landscape and its alignment with the current status of agricultural trade in Tanzania and its limitations for indigenous crops. Additionally, content analysis was applied to examine the extent to which indigenous crops are referenced within these policies. Specific attention was given to identifying supportive measures, regulatory constraints, and market barriers affecting indigenous crops. The findings provided insights into policy gaps and opportunities for strengthening the trade potential of indigenous crops.

## 2.3 Trade data analysis

To evaluate trade performance, statistical analysis of agricultural trade data was conducted. Data sources included official databases such as the Tanzania Revenue Authority (TRA), the Ministry of Agriculture, the United Nations Comtrade database, and the Food and Agriculture Organization (FAO). Key indicators analyzed included export and import volumes, trade values, and market destinations for selected indigenous crops. Trend analysis techniques were used to compare the trade performance of indigenous crops with other major agricultural commodities. This helped identify market gaps and opportunities for scaling up indigenous crop trade.

While the study provides valuable insights, certain limitations should be acknowledged. Policy documents may not always reflect the latest market conditions, and trade data availability may be constrained by reporting inconsistencies or delays. Additionally, the analysis focuses on select indigenous crops, which may not fully represent the diversity of traditional agricultural commodities in Tanzania. By integrating policy review and trade data analysis, this study offers a holistic understanding of Tanzania's agricultural trade landscape. The findings aim to inform policymakers and industry stakeholders on strategies for enhancing the market potential of indigenous crops and fostering inclusive trade development.

# 3 Results and discussion

## 3.1 Current agricultural trade performance

Tanzania's trade performance in 2024 reflects a dynamic and growing economy, particularly in terms of exports and imports (Aguiar et al., 2020). Historically, Tanzania has faced challenges in achieving self-sufficiency in the production of certain agricultural commodities, such as edible oils and sugar, leading to a reliance on imports to meet domestic demand (Peter Mgeni et al., 2019; Rweyendela and Mwegoha, 2020). In the year ending February 2024, exports of goods and services rose by 14.7%, reaching USD 14,274 million compared with the level recorded in the corresponding period in 2023. This growth has been driven by non-traditional exports such as oil seeds, horticultural products, and fish and traditional exports like gold, which remains a major contributor to Tanzania's foreign exchange earnings (World Bank, 2021). Imports also increased, reaching USD 14.15 billion in May 2024, indicating strong domestic demand for intermediate and consumer goods. However, this growth has widened the trade deficit to approximately USD 3.13 billion. The economy continues to expand, supported by sectors such as tourism, manufacturing, and agriculture (World Bank, 2021).

The trade performance of indigenous crops in Tanzania remains underdeveloped despite their significant potential to enhance food security and livelihoods. Crops such as cassava, sorghum, millet, and African indigenous vegetables (AIVs) are predominantly traded in rural markets, with minimal penetration into urban or international markets. This limited market reach is primarily attributed to weak value chains, inadequate formal support, and insufficient market recognition, all of which hinder their commercial viability and broader economic impact. Strengthening these areas could unlock new opportunities for indigenous crops, fostering a more inclusive and resilient agricultural sector.

A few initiatives, such as the Good Seed Initiative (GSI), have improved indigenous crops' production and market linkages, especially AIVs. Through better seed quality and farmer-to-farmer training, GSI projects have boosted the incomes of smallholder farmers in regions like Arusha and Dodoma. However, large-scale commercialization remains challenging due to inadequate infrastructure, limited awareness, and lack of value addition to these crops. Policy recommendations stress the need for Tanzania to integrate Indigenous crops into national trade policies, boost research funding, and promote marketing strategies to enhance their visibility

in domestic and international markets (John et al., 2024). Indigenous crops like cassava and sorghum are recognized globally, but many others remain underexploited despite their resilience and adaptability to Tanzania's agricultural environment.

### 3.1.1 Indigenous crop export and import

Countries in Europe, North America, and Asia often dominate as export markets for crops in Tanzania due to their interest in superfoods, health-focused products, and exotic ingredients. Specific trade agreements and diaspora communities also influence demand. Figure 1. Tanzania's native agricultural products are gaining traction in international markets, with cassava being shipped to countries such as United states, China, Botswana, Congo, the European Union, and Southeast Asia. In 2022, Tanzania exported $13.9 million in cassava, making it the 18th largest exporter in the world. To increase the exports of cassava there is a need to strengthen the value chain through improved coordination, processing technologies, and market linkages that can enhance profitability and export opportunities for farmers. Pigeon peas are predominantly exported to China, Comoros, Congo, India, SA, Uganda and various nations within Europe. Tanzania experienced a significant increase in pigeon pea production, rising from 160,000 metric tons in 2018 to 250,000 metric tons in 2023, marking a 56% growth. During the period from 2020 to 2022, a substantial 95% of the country's pigeon pea output was exported to India, while 3% was sent to the United Arab Emirates. The remaining production was distributed among Nepal, Kenya, and Belgium. Other crops such as Baobab-derived products are sought after in the European Union, the United States, and Japan, while shea butter is also exported to the European Union, the United States, and China. Moringa enjoys a robust market in the United States, the European

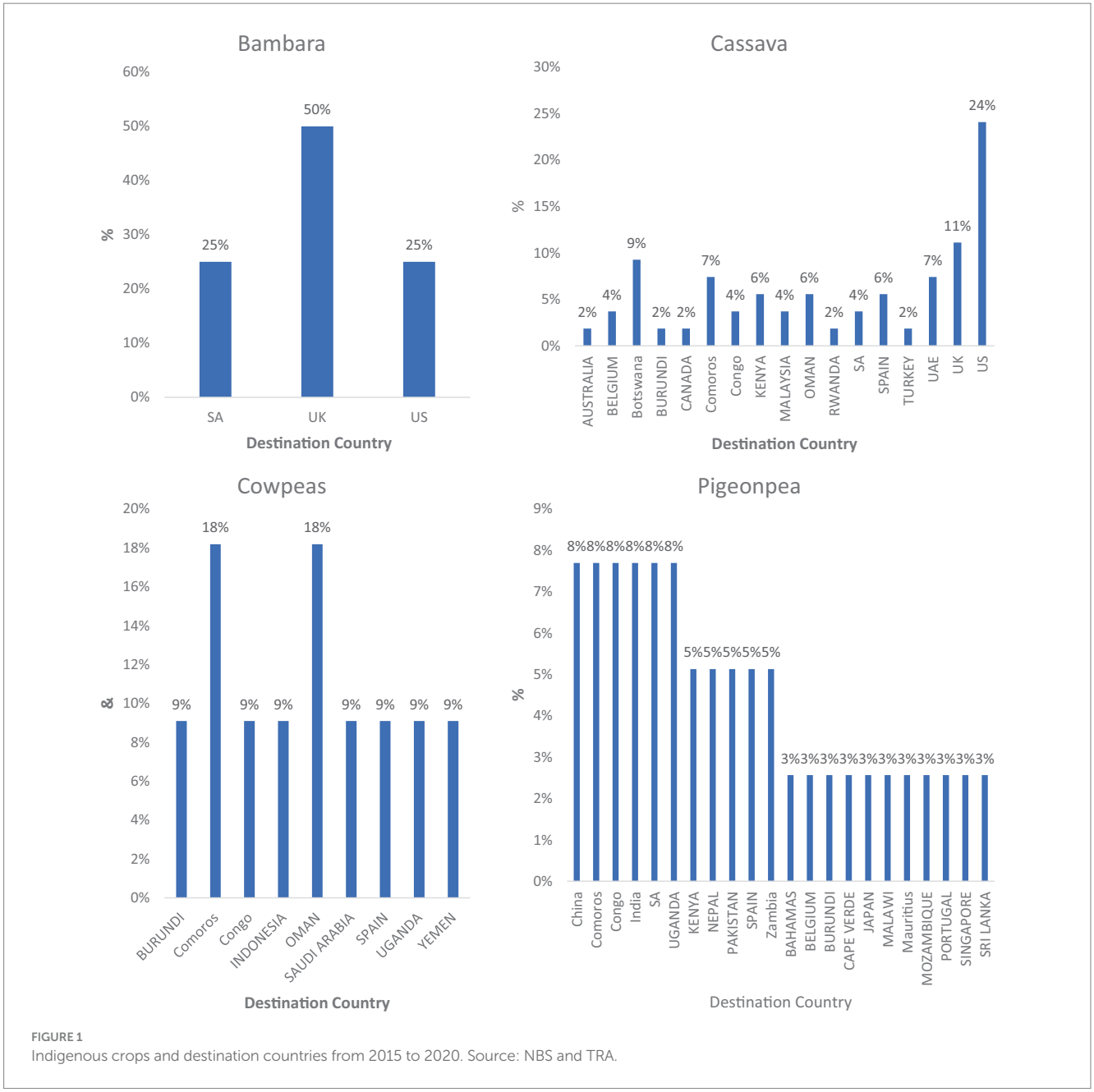


FIGURE 1
Indigenous crops and destination countries from 2015 to 2020. Source: NBS and TRA.

Union, and Australia, paralleling the demand for indigenous fruits like tamarillo and jackfruit, which are similarly popular in these regions.

Figure 2 shows Tanzania exports a variety of indigenous crops to several international destinations. Oman, accounting for 15% of exports, primarily imports crops such as clove, sesame, and pigeon peas. Comoros, with 14% of the export share, receives vanilla, cloves, and cinnamon. The United Arab Emirates, representing 13% of exports, is a key market for baobab, tamarind, and moringa. The United Kingdom, which accounts for 12%, imports crops like teff, baobab, and cassava. India, with 8% of exports, is a major destination for pigeon peas, sesame, and millet. The Netherlands and Pakistan each account for 7% of exports, with the Netherlands importing baobab, moringa, and tamarind, while Pakistan imports pigeon peas and millets. Kenya, at 6%, primarily receives cassava, sorghum, and pigeon peas.

Other destinations, including Belgium, Germany, Nepal, South Africa, and Uganda, each account for 4% of exports and receive a mix of baobab, teff, tamarind, and millet, depending on specific regional demand. Other countries include, France, Indonesia, Japan, Malawi Malaysia, Saudi Arabia, Spain, Thailand, Zambia, Bahamas, Bangladesh, Cape Verde, China, Denmark, Democratic Republic of Congo, Israel, Mozambique, Mauritius, Poland, Portugal, Rwanda, Singapore, Sri Lanka, Sweden, Switzerland, Taiwan, Province of China, United States, Vietnam and Yemen.

The main two indigenous crops imported into Tanzania are cassava and pigeon pea. These imports come primarily from neighboring countries such as Malawi, Mozambique, Nigeria, Uganda, as well as from the UAE, Vietnam, and Hong Kong (Figure 3). For crops like pigeon pea, the importation is largely driven by trade dynamics, particularly port issues in Tanzania. Malawi, for instance, is well-recognized for its large-scale production of pigeon peas, which are often exported via Tanzanian ports. However, due to logistical challenges at Tanzanian ports, pigeon peas are sometimes imported from Malawi and other neighboring countries, only to be re-exported to countries such as India, which is a major importer of this crop. This pattern of importation and re-exportation is also observed for other neighboring countries, where trade issues and port congestion in Tanzania can impact the smooth flow of goods.

Moreover, these imports of indigenous crops often reflect the broader challenges facing Tanzania's agricultural trade sector, including inadequate infrastructure, limited storage facilities, and inefficiencies at key transport hubs. As a result, countries like Malawi and Mozambique, which have more efficient agricultural production systems or trade routes, become key suppliers for Tanzania, even when these crops are produced locally. Additionally, some crops, like cassava, are imported from a variety of countries, including Nigeria and Uganda, due to similar issues surrounding trade facilitation and market demands across borders.

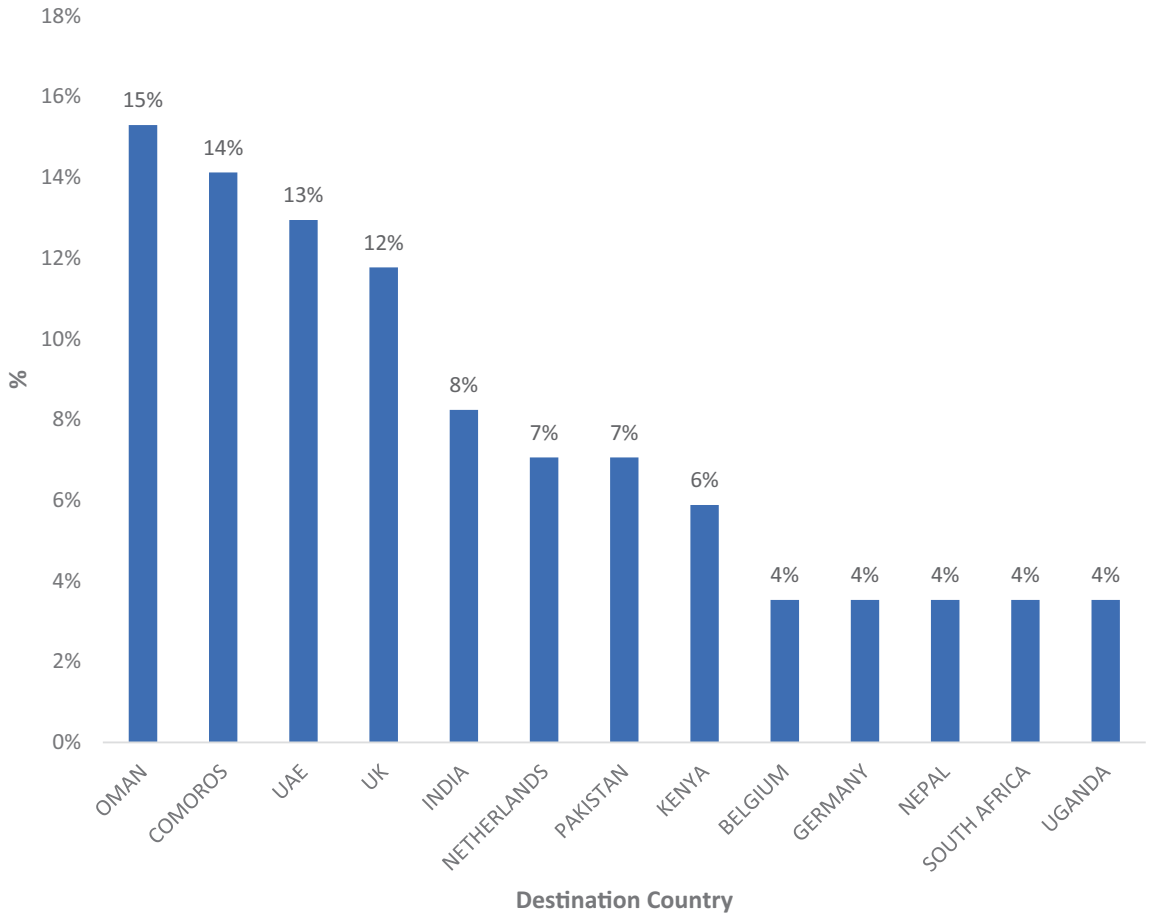


FIGURE 2
Destination countries for indigenous crops exports. Source: NBS and TRA.

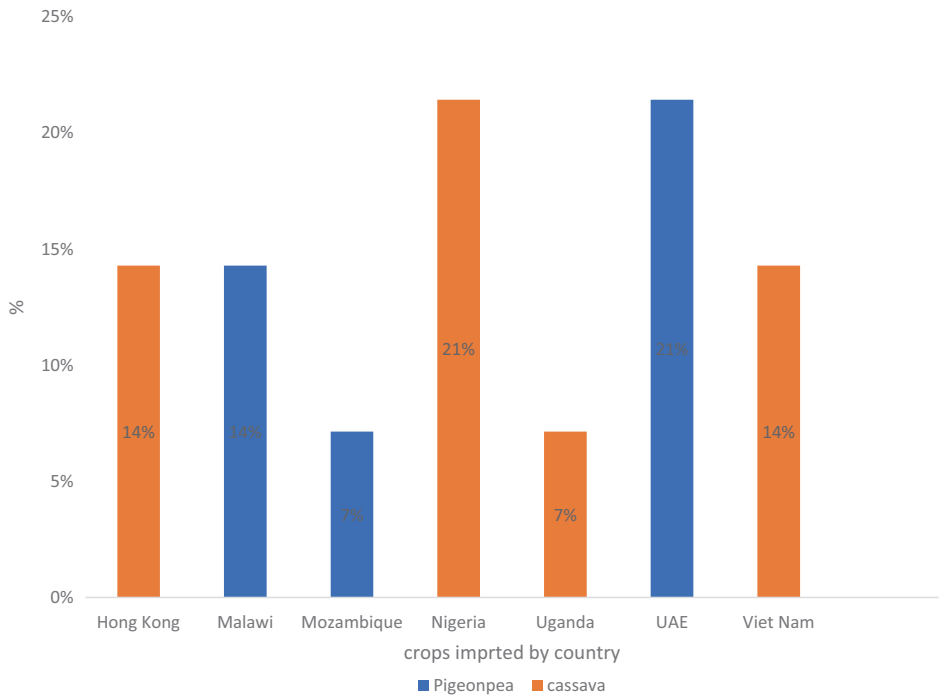


FIGURE 3
Indigenous crops imported. Source: NBS and TRA.

### 3.1.2 Comparing exotic and indigenous crops exports

In Tanzania, government policies play a crucial role in supporting the production and marketing of maize, a staple crop deeply embedded in the country's food security and cultural identity (Batho et al., 2019; Lyimo et al., 2014). These policies prioritize maize due to its widespread consumption, particularly in the preparation of ugali, a popular Tanzanian dish. Efforts include subsidies on agricultural inputs such as fertilizers and seeds, alongside investments in extension services to improve farming practices (Alliance for a Green Revolution in Africa (AGRA), 2022; Santpoort, 2020). Additionally, strategic interventions aim to enhance access to domestic and international markets, ensuring a steady demand for maize production (Kanyangemu et al., 2019). The crop is also a key focus in agricultural research, with ongoing programs dedicated to breeding new, high-yield, and drought-resistant varieties, further boosting its productivity and resilience (Santpoort, 2020). The crop has significant value in its imports and export (Figure 4).

The robust policy support and cultural significance of maize have resulted in its dominance in both imports and exports compared to indigenous crops like pigeonpea and cassava (Laizer et al., 2023; Reincke et al., 2018). Tanzania's maize exports significantly exceed those of pigeonpea and cassava, which, despite being nutrient-dense and climate-resilient, receive relatively limited policy attention (Figure 5). Unlike maize, pigeonpea and cassava are often grown by smallholder farmers for subsistence and localized markets, limiting their commercial potential. However, increasing interest in diversifying food systems and promoting indigenous crops could pave the way for more balanced trade dynamics (John, 2024). Targeted investments in research, production, and marketing of these indigenous crops could enhance their competitiveness, contributing to food security and economic diversification.

Over the years, maize exports in Tanzania have consistently outpaced those of cassava and pigeonpea, reflecting its dominance as an exotic staple crop (John, 2024). From 2015 to 2022, maize exports showed a sharp upward trend, peaking at 511,068 tonnes in 2022, driven by strong policy support and high market demand (Figures 4, 5). In contrast, cassava exports, though increasing significantly in recent years, remained relatively low, reaching a maximum of 73,401 tonnes in 2022. This disparity highlights the prioritization of maize in agricultural programs and its broader appeal in global markets.

Pigeonpea, as an indigenous legume, showed competitive export volumes. In Tanzania, it accounts for 4% of the world's pigeon pea production in inclusion to Malawi, Kenya, Mozambique, and Uganda (Vilakazi et al., 2025). Additionally, the crop is produced on 0.56 million hectares in Eastern and Southern Africa (Vilakazi et al., 2025). However, its exports fluctuated, reflecting challenges in market stability and policy support. Unlike maize, pigeonpea and cassava depend heavily on smallholder farming systems, limiting scalability. Despite their nutritional and climate resilience advantages, these indigenous crops require enhanced investment in production and market integration to compete effectively on international platforms (Gotor et al., 2020).

Looking at Figure 5, the exotic crop maize is performing well due to the fact that exotic crops often have better-established supply chain infrastructures, from post-harvest processing to export logistics due to supportive policies and structures for the crops such as crop boards like sugar, tea and coffee unlike indigenous crops that are integrated in one crop Cereals and Other Produce Regulatory Authority (COPRA) that regulates all crops including indigenous crops lacking specific crop focus (URT, 2024).

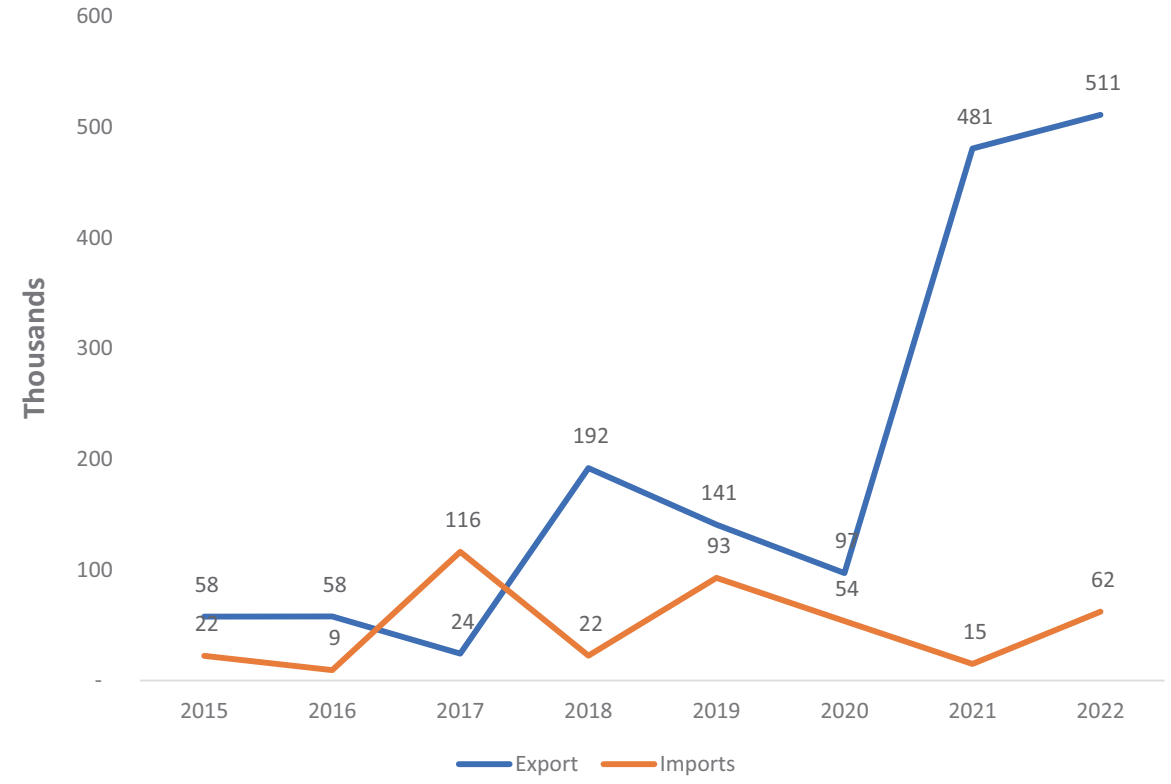


FIGURE 4
Export and imports volumes (in tonnes) of maize (exotic crop). Source: FAOSTAT (2024), NBS, and TRA.

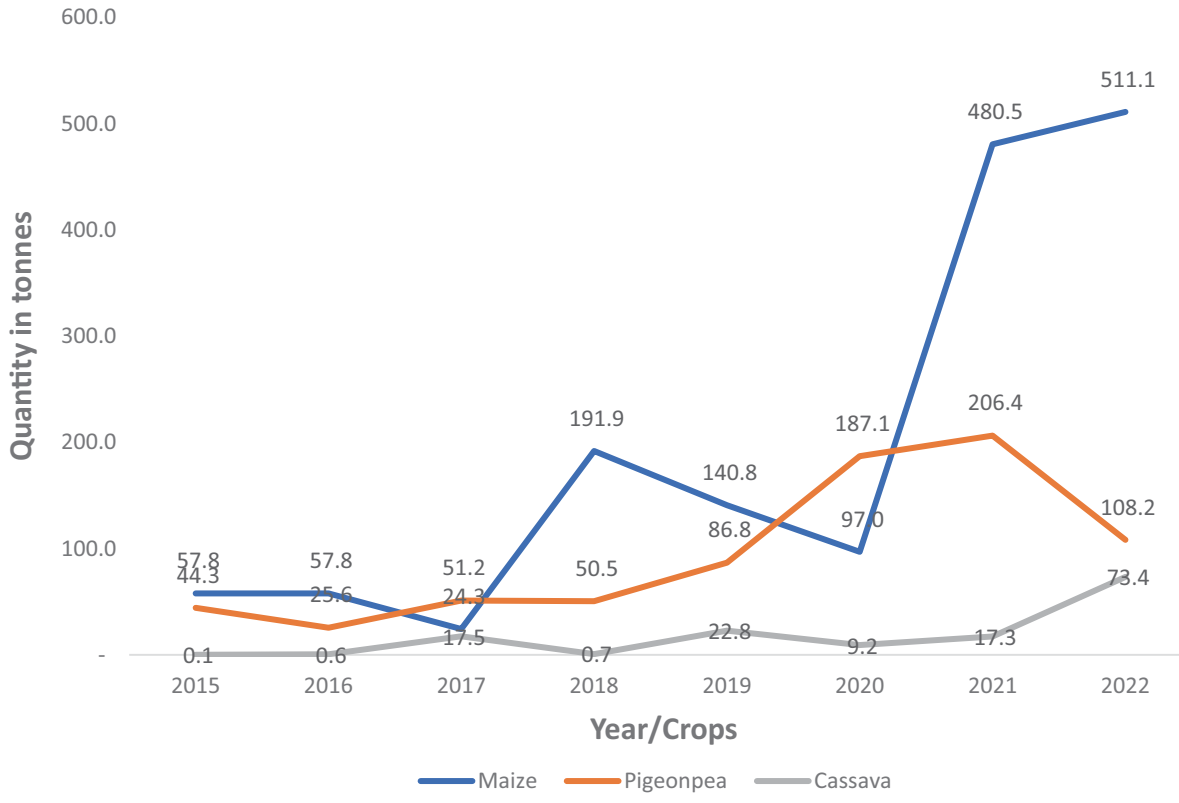


FIGURE 5
Export volumes (in tonnes) of maize (exotic crop), Pigeonpea, and Cassava (indigenous crops). Source: FAOSTAT (2024), NBS, and TRA.

The consumption levels are also higher and integrated in the local and global supply chain for crops like maize, rice, and wheat benefiting from higher demand and international trade agreements (Chivenge et al., 2015). While, indigenous crops typically are sold in informal markets, needing formal marketing channels, making their trade informal and localized. According to Bellon et al. (2015), the lack of market awareness and consumer preference for more widely known crops contributes to the marginalization of indigenous varieties, further constraining their market growth potential (Magbagbeola et al., 2010; Tadele, 2019).

## 3.2 Policy and market support for indigenous crops in Tanzania

The Policy analysis revealed that the reviewed agricultural documents primarily emphasize enhancing productivity, market access, and infrastructure for high-demand cash crops like maize, coffee, and cashew nuts. However, there is limited direct support for the inclusion of indigenous crops in agricultural trade. Indigenous crops, such as millet, sorghum, and pulses, are often viewed as subsistence crops, facing commercialization challenges due to lower yields, inadequate market access, and underdeveloped value chains (e.g., ASDP). Nonetheless, ASDP II presents emerging opportunities to promote these crops due to their climate resilience, nutritional value, and potential in niche health markets, necessitating greater investment in research, processing, and market integration.

The National Agriculture Policy (United Republic of Tanzania, 2013) emphasizes diversifying agricultural production and promoting both food and cash crops. While it highlights major export crops like coffee, cashew nuts, and tea, it also acknowledges indigenous crops such as sorghum, millet, and pulses for their contributions to food security and climate resilience. However, the policy's focus on these crops is limited due to inadequate commercialization, lack of research and development, and poor market access. Although it advocates for improving productivity and value chain integration of indigenous crops, there remains a gap in strategic focus to elevate these crops to mainstream agricultural trade.

The National Export Strategy aims to expand Tanzania's export base, prioritizing major agricultural commodities while mentioning indigenous crops for diversification and accessing niche export markets. This is particularly relevant given their resilience and nutritional benefits. However, the policies stress the need for enhanced value addition, Agro-processing, and market development to fully incorporate these crops into the export market. The Tanzania Industrial Competitiveness Report (TICR) supports this, emphasizing the development of competitive agro-industries focused on indigenous crops to bolster their trade contributions. However, challenges persist in scaling production and attracting investments in these sectors.

The National Trade Policy 2003 (United Republic of Tanzania, 2023) highlights the importance of promoting indigenous crops as part of diversifying the export base and enhancing food security. It emphasizes the potential of crops like millet, sorghum, and cassava to improve climate resilience and rural incomes, tapping into niche international markets, especially in health-conscious regions. The policy encourages value addition, Agro-processing, and research on indigenous crops, advocating for stronger public-private partnerships to support commercialization and export growth.

Regional integration frameworks, such as the East African Community (EAC) (2004) Customs Union Protocol and the Southern African Development Community (1996) Trade Protocol, provide opportunities for Tanzanian farmers to access larger regional markets for agricultural products, including indigenous crops. However, these crops are often underrepresented in trade agreements, which tend to focus on major cash crops. Nevertheless, regional policies encourage agricultural diversification, which could benefit indigenous crops if supported by adequate market infrastructure, value addition, and cross-border trade facilitation.

The African Continental Free Trade Area (AfCFTA) Agreement and various Bilateral Trade Agreements (with countries like China, India, and the EU) aim to expand international market access for African products, including agricultural goods. These agreements offer new opportunities for Tanzania to export indigenous crops, especially with the increasing global demand for organic and climate-resilient foods. In particular, the AfCFTA promotes intra-African trade, which could stimulate demand for indigenous crops across the continent. However, to fully integrate these crops into global trade, Tanzania must enhance its Agro-processing capacity, improve quality standards, and strengthen market linkages. Bilateral agreements, especially with the EU, present niche market potential for organic and health foods derived from indigenous crops.

The World Bank's "Tanzania Economic Update" and African Development Bank (AfDB) Agricultural Sector Reports underscore the significance of agriculture in driving Tanzania's economic growth. While the focus has traditionally been on cash crops like coffee, tea, and cashew nuts, indigenous crops such as millet, sorghum, and legumes are recognized for their climate resilience and food security potential. Both institutions advocate for targeted investments, infrastructure improvements, and policy reforms to better integrate indigenous crops into broader agricultural trade, emphasizing the importance of enhancing productivity and market access through value addition and Agro-processing initiatives.

Reports from the Food and Agriculture Organization (FAO) and the International Trade Centre (ITC) recognize the untapped export potential of Tanzania's indigenous crops, particularly in regional and niche global markets. They stress the importance of building capacity around value chain development, improving quality standards, and promoting awareness of the nutritional and ecological benefits of indigenous crops. According to the ITC, there are significant export opportunities for indigenous crops, especially in health-conscious markets in Europe and the Middle East, but achieving competitiveness requires better market linkages, infrastructure, and policy support.

Policy and regulatory frameworks, including the Seeds Act (United Republic of Tanzania, 2003), Plant Breeders' Rights Act (United Republic of Tanzania, 2012), and Fertilizers and Agricultural Chemicals Act (United Republic of Tanzania, 2009), establish a foundation for agricultural development in Tanzania but provide limited direct support for indigenous crops. The Tanzania Revenue Authority (TRA) Annual Reports highlight ongoing efforts to promote agricultural trade, yet the focus remains predominantly on major export crops. These laws primarily address inputs, such as seeds and fertilizers, indicating a need for more specific provisions that prioritize indigenous crops, particularly in research, seed development, and access to improved technologies. Regulatory reforms and supportive policies could incentivize the inclusion of indigenous crops in formal agricultural trade by enhancing access to quality inputs, protecting plant varieties, and promoting sustainable agricultural practices.

## 3.3 Bridging the missing puzzle for indigenous crop development and trade

The missing pieces in achieving the full benefits of indigenous crops are evident in the key documents supporting Tanzania's agricultural sector. To realize more benefits for the producers of these crops, it is essential to address these gaps by securing greater support from the government and other key stakeholders, including regulators, service providers, and producers themselves. The Agricultural Sector Development Programme (ASDP I & II), the National Agriculture Policy (United Republic of Tanzania, 2013), and various trade agreements predominantly focus on promoting high-demand cash crops while providing limited strategic attention to indigenous crops.

Although these documents recognize the potential of indigenous crops for enhancing food security and climate resilience, they often lack specific measures for their commercialization, value chain development, and market access. The absence of targeted investment and research into indigenous crop varieties, combined with inadequate promotion of Agro-processing and quality standards, hampers their integration into the formal agricultural trade system. This gap is particularly evident in the National Trade Policy and the National Export Strategy, which prioritize major export crops without sufficiently addressing the unique challenges faced by indigenous crops (Nigussie et al., 2025; Mdee et al., 2024). Addressing these issues requires a collaborative effort among all stakeholders to create a more supportive environment for indigenous crops, thereby unlocking their potential for economic growth and food security.

Moreover, in filling this gap, it is crucial to develop a comprehensive framework that supports the cultivation and commercialization of indigenous crops. This could include establishing targeted funding initiatives for research and development focused on indigenous crop varieties, improving market infrastructure to enhance access, and fostering partnerships between public and private sectors to promote Agro-processing. Additionally, integrating indigenous crops into regional and international trade agreements can help create demand in health-conscious markets, providing farmers with better opportunities for income generation. By prioritizing these actions, Tanzania can effectively leverage the resilience and nutritional value of indigenous crops, ensuring they play a vital role in the country's agricultural trade and contributing to broader economic growth and food security.

Lessons can be learnt of the successful incorporation of indigenous crops into mainstream commerce has been evidenced in several nations, particularly Ethiopia, India, and Nigeria. These examples underscore the economic and nutritional advantages associated with indigenous crops, alongside the obstacles encountered in their commercialization. The subsequent sections delineate critical elements of this integration. In Ethiopia the commercialization of Teff Economic Significance with teff sustaining over six million smallholder farmers, serving as a vital source of income (Ochieng and Cho, 2023). Studies reveal that Ethiopian consumers favor the incorporation of teff in products such as pasta and baby food, with a strong inclination toward organic certification and local brands (Ochieng and Cho, 2023). The commercialization of teff has the potential to mitigate nutritional deficiencies and bolster local economies through the development of value chains (Ochieng and Cho, 2023). In India the revival of millets Nutritional Advantages are acknowledged for their superior nutritional profile and resilience to varying climatic conditions, positioning them as a sustainable option for food security (Onomu, 2023). Government initiatives aimed at promoting millets have been instrumental in revitalizing traditional agricultural practices and improving market access (Onomu, 2023).

In Nigeria the Importance of Cassava for Health and Economic Contributions is highlighted in Indigenous crops such as cassava being rich in essential micronutrients and playing a crucial role in alleviating poverty in rural communities (Agulanna, 2020). Despite their advantages, the commercialization of cassava encounters challenges, including limited market penetration and insufficient awareness of their potential (Onomu, 2023). While the integration of indigenous crops into mainstream commerce offers numerous prospects, significant barriers such as market acceptance and consumer awareness persist. It is imperative to tackle these challenges through strategic governmental policies and collaborative efforts among stakeholders to ensure sustainable commercialization.

Despite Tanzania's rich diversity of indigenous crops, their economic contribution remains undervalued compared to exotic cash crops such as maize, coffee, and cashew nuts. Government policies and financial investments have historically prioritized these high-demand exports, leaving indigenous crops with minimal institutional support. This has created a misalignment between agricultural potential and national economic priorities, limiting the role of indigenous crops in contributing to GDP growth. In contrast, countries such as Ethiopia, India, and Nigeria have recognized the economic and nutritional value of their native crops—teff, millets, and cassava—by implementing targeted commercialization strategies (Ochieng and Cho, 2023; Onomu, 2023; Agulanna, 2020). These efforts have led to improved market access, increased income for smallholder farmers, and enhanced food security. If Tanzania adopted similar measures, indigenous crops could play a greater role in economic diversification, rural development, and sustainable agricultural growth.

While the potential benefits of greater investment in indigenous crops are evident, these opportunities must be approached cautiously. The complexities of funding mechanisms—whether through local financial mobilization, private sector involvement, or government support—require careful consideration in light of the shrinking donor space. Financially, increased trade and value addition would boost exports and attract investment in Agro-processing industries. This would generate employment opportunities, particularly for youth, by fostering entrepreneurship in food production, marketing, and value chain development. From a health perspective, promoting indigenous crops like sorghum, millet, and baobab could improve dietary diversity and address malnutrition through their high nutritional value. Additionally, these crops are naturally resilient to climate change, requiring fewer inputs such as water and fertilizers, thus contributing to environmental sustainability [Ochieng and Cho, 2023; Food and Agriculture Organization of the United Nations (FAO), 2021]. By aligning policies to support indigenous crops, Tanzania could leverage their economic.

## 3.4 Advancing indigenous crops through policy, market access, and innovation

Strengthening policy frameworks is essential for the successful inclusion of indigenous crops within Tanzania's agricultural trade.

Developing and implementing targeted policies that prioritize these crops within national agricultural strategies can significantly enhance their visibility and economic potential. This involves integrating indigenous crops into existing trade agreements, which can open new market opportunities and encourage investment. For instance, the National Agriculture Policy (United Republic of Tanzania, 2013) recognizes the importance of diversifying agricultural production, yet it requires further emphasis on indigenous crops to fully address their unique challenges (Ministry of Agriculture, 2013). Additionally, targeted measures for commercialization—such as financial incentives for farmers, research funding for crop development, and technical support for value chain enhancement—are crucial (African Development Bank, 2020). Ensuring that relevant policies specifically address barriers such as inadequate market access, limited research, and underdeveloped Agro-processing can help indigenous crops overcome systemic obstacles and thrive in both domestic and international markets (World Bank, 2021). By prioritizing these actions, Tanzania can unlock the full potential of its indigenous crops, contributing to food security and sustainable economic growth.

Improving market access and infrastructure is vital for enhancing the trade potential of indigenous crops in Tanzania. Investments in market infrastructure, such as transportation networks, storage facilities, and processing units, can significantly reduce post-harvest losses and increase the profitability of indigenous crops for farmers [Food and Agriculture Organization of the United Nations (FAO), 2021]. For instance, better road networks and transport systems can facilitate timely access to markets, allowing farmers to reach both local and international buyers more efficiently (African Development Bank, 2021). Additionally, creating strong market linkages that connect producers directly with consumers, wholesalers, and exporters is essential for promoting fair pricing and increasing demand for indigenous crops (International Trade Centre, 2024). Initiatives such as farmers' cooperatives or digital marketplaces can empower smallholder farmers by providing them with greater bargaining power and access to wider markets (World Bank, 2021). By addressing these infrastructure gaps and fostering effective market connections, Tanzania can not only enhance the commercial viability of indigenous crops but also contribute to rural development and economic resilience.

Enhancing research and development (R&D) for indigenous crop varieties is crucial for improving their yields, pest resistance, and nutritional quality in Tanzania. Increased investment in R&D can lead to the identification and breeding of resilient crop varieties that are better suited to local environmental conditions and market demands [Food and Agriculture Organization of the United Nations (FAO), 2021]. Collaborating with research institutions, universities, and agricultural extension services can facilitate the dissemination of innovative practices and technologies that support sustainable cultivation methods (African Development Bank, 2020). For example, public-private partnerships can drive the development of new agricultural technologies and practices that are tailored to the unique needs of indigenous crops, thereby increasing their competitiveness (World Bank, 2021). Additionally, focusing on participatory research approaches that involve farmers in the innovation process can enhance the relevance and adoption of new varieties and practices (International Fund for Agricultural Development, 2019). By prioritizing R&D for indigenous crops, Tanzania can improve food security, boost rural incomes, and foster sustainable agricultural practices that benefit both producers and consumers.

Encourage the establishment of Agro-processing facilities to add value to indigenous crops. This can create jobs, increase income for farmers, and enhance the marketability of these crops in both domestic and international markets. Also, engage key stakeholders, including government agencies, NGOs, and the private sector, to create collaborative initiatives that support the commercialization of indigenous crops. By fostering public-private partnerships, stakeholders can share resources, expertise, and networks to drive the inclusion of indigenous crops in agricultural trade.

Incorporating indigenous crops into established trade frameworks presents an opportunity for Tanzania to broaden its agricultural export portfolio, diminish reliance on conventional cash crops, and engage with specialized health-oriented markets on a global scale. By advancing their commercialization through enhanced policies, improved market access, and the development of value chains, rural incomes can be elevated, job opportunities can be generated, and the agricultural sector's overall impact on the national economy can be fortified. Furthermore, emphasizing indigenous crops is consistent with sustainable development objectives, promoting ecological equilibrium while simultaneously tackling the intertwined issues of malnutrition and poverty.

Future investigations and initiatives should concentrate on maximizing the market potential and trade integration of indigenous crops by addressing significant knowledge and infrastructure deficiencies. Conducting market analyses is essential to discern consumer demand patterns, pricing frameworks, and export possibilities, especially within health-oriented and specialized markets (Chisholm, 2011; Sundarrajan, 2023). Additionally, efforts must emphasize the development of value chains, which includes enhancing Agro-processing technologies, minimizing post-harvest losses, and improving packaging and branding to increase competitiveness. Upgrading infrastructure, such as transportation systems, storage facilities, and digital marketplaces, is vital for facilitating efficient trade. Furthermore, public awareness campaigns should be implemented to underscore the nutritional and ecological advantages of indigenous crops, thereby promoting greater consumer acceptance at both local and international levels (Akinola et al., 2020).

Equally important is the need to address policy and research deficiencies. In-depth studies should assess current agricultural and trade policies to pinpoint obstacles that hinder the integration of indigenous crops into formal trade frameworks, thereby informing targeted policy reforms. Investments in breeding initiatives and agronomic research can bolster the climate resilience, pest resistance, and overall productivity of indigenous crops, ensuring their competitiveness. Collaborations between public and private sectors, along with regional trade agreements such as the African Continental Free Trade Area (AfCFTA), can stimulate innovation, investment, and cross-border trade opportunities. Finally, examining the social and cultural importance of indigenous crops can facilitate the incorporation of traditional knowledge into contemporary agricultural practices, thereby creating distinctive selling propositions and preserving cultural heritage.

## 4 Conclusion

The overall objective of this study was to analyze the trade performance of indigenous crops in Tanzania and identify strategies

for improving market access and value chains. The study revealed that despite their potential, indigenous crops face significant challenges in accessing both domestic and international markets. Our analysis indicates that targeted investments and policy interventions are necessary to unlock the economic potential of these crops. The policy review process indicates that there is limited policy support for the trade of indigenous crops in Tanzania with very few policies having the little or no elaborate details on indigenous crops as compared with other cash crops such as rice, coffee, and cashew nuts, wheat and maize. There is a lack of policies that prioritize indigenous crops as strategic commodities. This lack of institutional support creates challenges at farm level in the promotion of indigenous crops. Obstacles for farmers include inadequate market access, and a lack of knowledge about the potential of native crops. Because of the current market demand, export incentives, and government policy, cash crops continue to be prioritized by many farmers. This is the case even in the context of the growing concerns around climate change. Focusing on indigenous crops offers a sustainable way forward for food security as these crops are generally more resilient to drought and pests and could be vital in ensuring food security in the face of unpredictable weather patterns.

The study identifies several initiatives to enhance the trade of indigenous crops, grounded in the need for a supportive policy environment. Findings highlight that integrating indigenous crops into national agricultural strategies, such as Tanzania's Agricultural Sector Development Program (ASDP), is a foundational step. The research points to the effectiveness of targeted financial interventions—including input subsidies for seeds and equipment, credit schemes with low interest rates, and tax incentives—as mechanisms to stimulate indigenous crop production. Furthermore, the study emphasizes the potential of niche international markets, particularly those demanding organic, gluten-free, and heritage crops. Positioning indigenous crops as premium products emerged as a key recommendation, requiring coordinated efforts among policy-makers, export promotion agencies, and trade missions. Importantly, the research underscores the necessity for evidence-based, actionable strategies derived from scientific inquiry to effectively promote indigenous crop systems.

Research on indigenous crops in Tanzania is essential for realizing their full trade potential, which could significantly contribute to food security, climate resilience, and economic growth. Several key research areas remain underexplored and require collaboration among various stakeholders to address gaps in the indigenous crops trade landscape. Cost–benefit analyses, along with studies on the scalability of their cultivation, are needed to quantify the benefits of transitioning to or expanding their production. A thorough analysis of the economic benefits of cultivating these crops, including cost–benefit evaluations of expanding or transitioning to indigenous crop production, is necessary. Additionally, the international demand for indigenous crops and their value-added products warrants investigation, focusing on trade barriers, certification requirements (e.g., organic, fair-trade), and identifying potential markets for crops such as baobab, teff, and moringa. By concentrating on these critical research areas, Tanzania can enhance the cultivation, commercialization, and sustainability of its indigenous crops. This research will be instrumental in devising solutions that contribute to improved food security, increased climate resilience, and the upliftment of rural livelihoods.

## Author contributions

IJ: Conceptualization, Formal analysis, Investigation, Methodology, Supervision, Visualization, Writing – original draft, Writing – review & editing. CG: Conceptualization, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The authors declare that no Gen AI was used in the creation of this manuscript.

## Publisher's note

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# Appendix

## Table A1

TABLE A1 List of reviewed documents.

| | Document | Selection criteria |
|---|---|---|
| 1. | Tanzania Agricultural Sector Development Programme (ASDP) I and II | Government's plans and strategies for developing Tanzania's agricultural sector, including trade objectives, market linkages, and policy support for agricultural products. |
| 2. | National Agriculture Policy (United Republic of Tanzania, 2013) | Overarching framework for the agricultural sector, addressing production, trade, market access, and support for both staple and Indigenous crops |
| 3. | National Trade Policy 2003 (United Republic of Tanzania, 2023) | Offers insights into the country's trade policies, focusing on promoting agricultural exports, trade liberalization, and market access for Tanzanian crops. |
| 4. | National Export Strategy | Initiatives to boost agricultural exports, diversification efforts, and support for crops with export potential, including indigenous crops. |
| 5. | Tanzania Industrial Competitiveness Report (TICR) | Covers the agricultural sector and Agro-processing, highlighting the potential for indigenous crop commercialization. |
| 6. | East African Community (EAC) Customs Union Protocol | Trade agreements within the EAC region include tariffs, trade barriers, and opportunities for regional trade in agricultural products, which could affect the trade of Indigenous crops. |
| 7. | Southern African Development Community (SADC) Trade Protocol | Offers insights into how Tanzania engages in trade with its southern African neighbors, including the movement of agricultural goods across borders. |
| 8. | African Continental Free Trade Area (AfCFTA) Agreement | Significantly impacts the agricultural trade landscape, offering opportunities for Indigenous crops to access a broader African market. |
| 9. | Bilateral Trade Agreements (e.g., with China, India, the EU) | Help understand market access provisions and tariff reductions for agricultural exports from Tanzania. |
| 10. | World Bank's "Tanzania Economic Update | analysis on Tanzania's agricultural performance, export trends, and economic policies affecting trade. |
| 11. | Food and Agriculture Organization (FAO) Country Profiles | Comprehensive data on agricultural production, consumption, and trade in Tanzania, with a focus on food security and Indigenous crops |
| 12. | International Trade Centre (ITC) | Provides trade potential assessments, highlighting crops (including indigenous varieties) with potential for growth in international markets. |
| 13. | Tanzania Revenue Authority (TRA) Annual Reports | Provide data on agricultural exports and imports, focusing on revenue generation from various agricultural commodities, including indigenous crops. |
| 14. | African Development Bank (AfDB) Agricultural Sector Reports | Reports cover development projects and trade initiatives in Tanzania, particularly regarding agricultural trade and market integration. |
| 15. | The Seeds Act (United Republic of Tanzania, 2003) and The Plant Breeders' Rights Act (United Republic of Tanzania, 2012) | Regulate the seed industry and intellectual property rights in agriculture, which are critical for developing and trading Indigenous crops. |
| 16. | The Fertilizers and Agricultural Chemicals Act (United Republic of Tanzania, 2009) | Act regulates inputs in the agricultural sector, impacting the productivity of Indigenous crops and their competitiveness in the market. |
| 17. | Tanzania Development Vision 2025 | The long-term development plan outlines the country's ambitions for economic growth, food security, and agricultural development, and it includes trade strategies for boosting agricultural exports. |