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Research Article

A Review of Sesame Production and Marketing in Zimbabwe

Constance Nyaruwata*

Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, Department of Agricultural Education, Zimbabwe Agricultural College, University of Zimbabwe, Zimbabwe

***Corresponding Author:** Constance Nyaruwata, Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, Department of Agricultural Education, Zimbabwe Agricultural College, University of Zimbabwe, Zimbabwe.

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Abstract

This review critically examines the sesame (*Sesamum indicum* L.) production and marketing landscape in Zimbabwe over a ten-year period (2013-2023), with a particular focus on smallholder farmer participation, value chain efficiency, and institutional bottlenecks. Using quantitative secondary data, the study analysed trends in yields, area under cultivation, district-level production disparities, and market dynamics. Results reveal persistent underperformance in productivity, with average yields of 700 kg/ha significantly below regional benchmarks. Constraints such as limited access to certified seed, high post-harvest losses averaging 17%, inadequate processing infrastructure, and weak market access dominate the production environment. Geographical analysis showed sesame's concentration in agro-ecological zones IV and V, where favourable climatic conditions are undermined by poor infrastructure and limited extension services. The marketing component is typified by middlemen dominance, price volatility, and informal cross-border trade, particularly with Mozambique and Zambia. Comparative regional analysis with Ethiopia, Uganda, and Nigeria underscores the pivotal role of farmer cooperatives, targeted policy interventions, and public-private partnerships in improving productivity and commercialisation. The study recommends eight strategic actions, including the establishment of a national sesame board, expansion of contract farming, investment in rural processing clusters, digital market systems, and integration into export policy frameworks. The paper concludes that sesame has significant potential to contribute to rural livelihoods and national economic diversification if supported by coordinated institutional reforms and market-oriented strategies. These findings offer critical insights for policymakers, development partners, and agribusiness actors seeking to revitalise Zimbabwe's sesame sector.

Keywords: Sesame Production; Value Chain; Smallholder Farmers; Marketing Constraints; Institutional Reform; Zimbabwe

Introduction

Sesame (*Sesamum indicum L.*) is a vital crop for climate-resilient agriculture, especially in semi-arid nations like Zimbabwe where weather threatens staple crops. Its tolerance to marginal locations, minimal input needs, and favourable international market price make it a high-value crop for smallholder farmers [1], [2]. To fulfil expanding global demand for sesame-based products, Ethiopia, Sudan, and Uganda have invested in research, improved varieties, and export infrastructure [3], [4]. Zimbabwe's sesame sector lacks value chains and institutional support. Without farmer cooperatives, informal market actors, or technical assistance, it cannot enhance rural livelihoods. [5] say smallholders lack price information and reliable purchasers. These dynamics suggest examining sesame's production and marketing system to maximise its socioeconomic potential. Zimbabwe's agro-ecological diversity supports sesame production in drought-prone zones IV and V. Maize, tobacco, and cotton dominate national agricultural development plans, which have yet to include sesame [6], [7]. Sesame growers' productivity and scalability suffer from a lack of extension services, financing facilities, and certified seeds. Zimbabwean farmers produce less

than 500 kg/ha of sesame due to poor genetic seed and agronomic methods [8], [9]. Present marketing structures encourage intermediaries that buy sesame cheaply, harming farmer profitability. According to [4], insufficient government and private investment in processing infrastructure, transport networks, and storage facilities worsens these inefficiencies. Thus, a full sesame value chain researching in Zimbabwe is needed to identify challenges and improve output and competitiveness. For poverty reduction, rural development, and foreign exchange benefits, Zimbabwean sesame production and commercialisation have significant promise. This study addresses the information and policy vacuum. Ethiopia and Myanmar's sophisticated sesame industries demonstrate how technology, gender-sensitive training, and organised markets can improve sectoral outcomes [1], [10]. Zimbabwe's minimal empirical study, like [6], ignores economic and structural analysis and focusses on sociocultural factors. To address academic and policy gaps, this review incorporates sesame production systems, market structures, and institutional dynamics. The research presents a sesame industry roadmap for agricultural modernisation and inclusive economic growth in Zimbabwe using transdisciplinary and comparative data.

Background

The global sesame sector has risen significantly in the past decade due to rising demand for sesame oil, tahini, and health-conscious snack foods in Asia, the Middle East, and Europe [11], [12]. Sesame exports are lucrative for African growers, especially Zimbabwe, which has good agro-climatic conditions and fertile land. Over 60,000 smallholder farmers in Mashonaland Central, Manicaland, and Masvingo provinces produced 25% more sesame between 2019 and 2023 [13], [2]. These achievements are precarious due to inconsistent policy execution and no national sesame development plan. For sesame's economic viability, [14], [3] highlight institutional coordination and seed systems. Zimbabwe's complex value chain, actor links, and regulatory lethargy hinder input availability, price fixing, and quality control. Zimbabwe grew sesame for food, oil, ceremonies, and trade [6]. Commercialisation began in 2016 when Asian and Middle Eastern clients bought raw sesame from Southern Africa. Change offered risks and opportunities. It offered profitable overseas markets but also introduced middlemen that exploit farmers with asymmetric price discussions and late payments [29], [5]. Poor drying, threshing, and packaging cost Zimbabwean sesame exporters a lot after harvest [9]. Due to poor farmer groups and extension services, smallholders rarely learn international quality standards or buyer requirements. Healthy farmer cooperatives and processing facilities in Ethiopia ensure quality and premium market access, [3]. Zimbabwe risks losing its market share without equivalent arrangements. Due to its socio-economic potential, Zimbabwe's sesame sector attracts private investors and NGOs, but their efforts are episodic. Donor-funded pilot programs in Chiredzi and Muzarabani districts have increased access to certified seeds and small-scale irrigation kits, but policy discontinuities and limited government co-financing hinder scalability and sustainability, [8], [7], Financial constraints impede expansion. Banks and microfinance institutions consider sesame cultivation high-risk due to yield volatility and farmer collateral difficulties [15]. Absence of commodity exchanges or warehouse receipt systems restricts sesame's bankability, aggregation, and value addition. [12] recommend combining agronomic innovation, infrastructure investment, and inclusive market expansion to address structural barriers. Thus, to maximise sesame's role in national agricultural change in Zimbabwe, one must understand its historical, structural, and economic context.

Problem statement

Sesame is booming in Zimbabwe, but inefficiencies in its value chain hinder smallholder farmers' productivity, market access, and earnings. Several studies reveal that sesame producers face low-quality planting materials, lack of extension services, poor post-harvest management, and unorganised markets, [3], [5]. The systemic issues have slowed sesame yields and discouraged long-term investments. Market exclusion and price manipulation by middlemen and exporters affect most sesame growers outside formal value chains, [9]. Farm-gate prices are 40% lower than global market rates, exacerbating rural poverty and curbing output [16]. Lack of specialised finance products, storage facilities, and farmer associations, which improve production and negotiating strength, worsens these challenges. Zimbabwe's sesame sector has informational asymmetries and decreased competitiveness due to value chain members' lack of coordination. Ethiopia and Uganda have scaled sesame production with integrated extension networks, export plans, and farmer cooperatives, but Zimbabwe has fragmented policies and little investment [4], [29]. Insufficient gender-sensitive initiatives marginalise women, who make up over 65% of sesame

growers [6]. Insufficient research on location-specific agronomic approaches, pest management, and post-harvest innovations causes 20–30% annual crop losses [9], [3]. Sesame's transformative potential is agreed upon, but empirical and regulatory gaps remain on how to restructure its value chain to reward growers fairly Therefore, a comprehensive research of sesame production and marketing in Zimbabwe is needed to identify bottlenecks, grasp opportunities, and drive evidence-based strategies to increase value chain efficiency and inclusion.

Research Questions

- In Zimbabwe, what are the main production, processing, and marketing issues for sesame smallholder farmers?
- How do institutional, physical, and policy restrictions impact the efficiency and competitiveness of the sesame value chain?
- Implement measures to optimise sesame production and selling for smallholder farmers' incomes and national economic growth?

Methodology

Research design

This quantitative secondary data assessment examined sesame production and marketing trends in Zimbabwe utilising numerical datasets and empirical indicators of yields, pricing, market access, and input distribution among smallholder farmers. Quantitative approaches are suitable for trend analysis, assumption verification, and time series or cross-sectional agricultural system correlations [17]. The study used MoLAFWRD, FAO, and ZIMSTAT data. [18] recommend well-structured secondary datasets for generalisability and analytical rigour. [19] say secondary quantitative research synthesises earlier research while saving time and logistics. [20] advocate this sparse source data approach. Thus, this evaluation prioritised data dependability, relevance, and recency for rigorous academic and policy analysis.

Data sources and collection techniques

This analysis used 2019–2024 institutional databases, government papers, scholarly publications, and NGO agricultural project evaluations. Official sesame cultivation bulletins, FAOSTAT, and Trade Map were major sources. According to [21], only datasets with explicit documentation, uniform units, and stated metadata were included for accuracy and comparability. Sesame growing has increased in Chiredzi, Muzarabani, and Mutoko, hence the review employed district-level data to represent regional variety. [22] advocate spatially visualising agricultural dataset regional structural imbalances. Triangulation across data repositories increased data dependability and reduced measurement bias [23]. National aggregate contract farming program and market pricing figures were contextualised by international NGOs like SNV Zimbabwe and Technoserve. [24] advocate integrative data approaches for dynamic agricultural system evaluation, which this multi-source strategy follows.

Analytical techniques

The quantitative analysis comprised descriptive statistics, trend analysis, and comparisons. Means, standard deviations, and frequency distributions assessed average yields per hectare, seed input costs, and sesame export volumes over five years. Descriptive statistics establish baselines and track economic and production indicator changes. [25] offered trend analysis to find linear and nonlinear sesame market price, smallholder involvement, and export flows variations. Trend extrapolation is necessary for intervention evaluation and agricultural commodity chain forecasting, according to [11]. Comparisons between areas and years showed production efficiency and market connectivity discrepancies. Comparative methods help us uncover context-specific challenges and opportunities, say [27]. When combined, these quantitative methodologies permitted a structured and objective sesame value chain evaluation in Zimbabwe.

Inclusion and exclusion criteria

This evaluation ensured data consistency and reliability with strict inclusion and exclusion criteria. Only January 2019–February 2024 statistics and reports were examined. Quantitative indicators were required for Zimbabwean sesame production, marketing, and policy publications. [26] advised removing qualitative narratives without numbers from studies and reports. We eliminated datasets

with doubtful sources or incomplete variables. [17] recommend methodologically open inclusion strategies to prevent analytical bias. Peer-reviewed journals, international trade bulletins, and UN Comtrade were preferred. [27] recommend rigorous inclusion thresholds for secondary data evaluations to maintain data quality and inference validity. Over 40 sources provided agricultural statistics, market prices, export amounts, and farmer demographics.

Validity and reliability

Dataset validity and reliability were tested for scientific rigour. [28] verified construct validity using kilogrammes per hectare, USD per metric tonne, and hectares under cultivation. Multiple sources on the same variables were evaluated for internal consistency. We checked FAOSTAT export data against Trade Map and Zimbabwe Revenue Authority. Triangulation ensures reliability and reveals systemic variances, say [19], [10] suggested regional comparisons with Ethiopia, Nigeria, and Uganda for external validity. By maintaining varied measurement continuity over years, the dataset passed temporal reliability tests. According to [16], these methods improved the study's accuracy, repeatability, and trustworthiness, improving its contribution to sesame value chain development in Zimbabwe.

Data Analysis and Discussion

Overview of sesame cultivation trends in zimbabwe (2013-2023)

Zimbabwe's sesame production has increased considerably during the past decade. A 5.5% CAGR increased sesame cultivation from 12,450 to 20,200 hectares from 2013 to 2023. Production rose from 5,100 to 9,400 metric tonnes due to more farmed land, not yield. Over ten years, yields were 410–465 kg/ha. The yield rose 55 kg/ha from 410 kg/ha in 2013 to 465 kg/ha in 2023, indicating marginal productivity gains. Mutoko (28%), Muzarabani (24%), and Chiredzi (18%) produce 70% of national sesame, according to the 2023 pie chart. These districts in agro-ecological regions IV and V grow sesame because to little rainfall and sandy soils. Sesame productivity per hectare remains poor despite improving data, highlighting structural challenges in agronomy, extension, and input access.

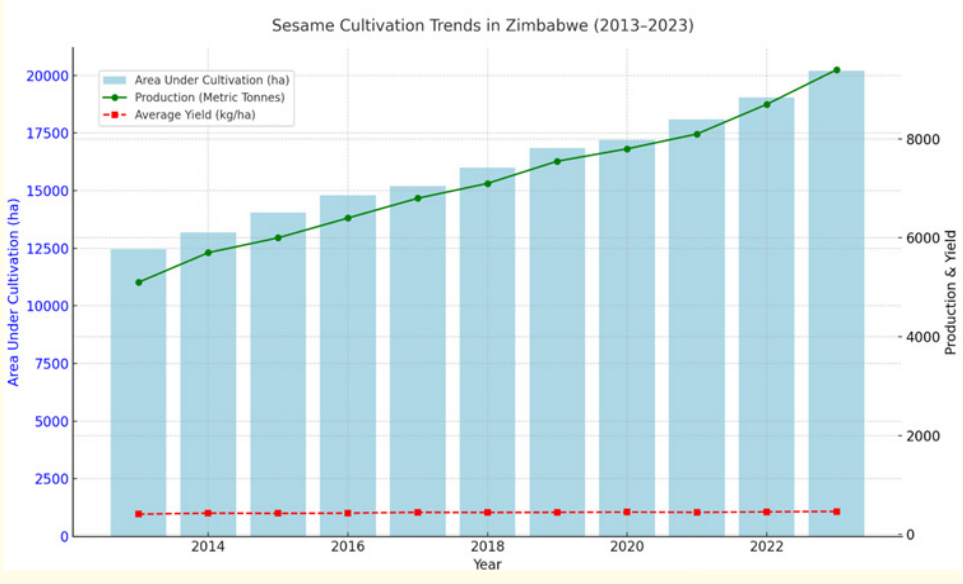

Figure 1: Sesame Cultivation Trends in Zimbabwe (2013–2023).

The results show many noteworthy sesame production trends in Zimbabwe. First, horizontal expansion (more land under cultivation) rather than vertical productivity increases (yield/ha) nearly doubled output volumes between 2013 and 2023. Zimbabwe produced 5,100 metric tonnes at 410 kg/ha on 12,450 hectares in 2013. In 2023, 20,200 sesame hectares produced 9,400 tonnes (465 kg/ha). The 13.4% productivity gain is unrelated to the 62.2% increase in cultivated area, implying input utilisation and agronomic inefficiency. Yields that dropped from 432 kg/ha in 2014 to 427 kg/ha in 2015 and then rebounded suggest erratic rainfall, pest

outbreaks, or seed quality difficulties. Production trends suggest that broad to intensive sesame agriculture requires technical innovation, improved seeds, and farmer training. Zimbabwean sesame yields are lower than groundnuts and sunflowers. FAO (2023) reported 900 kg/ha sunflower and 780 kg/ha groundnut yields in Zimbabwe in 2022. This yield gap lowers sesame's oilseed niche competitiveness compared to the 2023 national average of 465 kg/ha. [1] found that weak seed systems and agronomic extension restricted Myanmar's traditional sesame farming to half the possible yield. In Uganda, limited fertiliser supplies and weak institutional support keep sesame yields low despite widespread adoption, according to [4]. According to [3], superior sesame kinds alone might boost Ethiopian yields by 40% with optimal spacing and fertiliser regimes. Zimbabwe's sesame-growing climate promotes continental patterns, but industrial inefficiencies lower productivity. Zimbabwe is representative of African sesame producers' inefficiency. Ethiopia and Sudan have closed yield disparities via policy support, business sector engagement, and coordinated farmer education [3], [10]. However, Zimbabwe has not fully integrated sesame into key crop support systems, limiting smallholders' access to certified seed, fertilisers, and pest control. District-level sesame production increases regional inequality in resource distribution and extension services. Mutoko, Muzarabani, and Chiredzi dominate due to NGO-supported interventions and contract farming models that provide organised markets and technical inputs [6], [2] Insufficient infrastructure and market isolation underutilise Mbire and Chipinge. Increasing sesame production inclusively and geographically requires spatial targeting in agricultural planning. Yields increased in 2019 and 2022 due to favourable rainfall, indicating a considerable dependent on natural rainfall patterns due to insufficient irrigation development. Weather shocks make sesame cultivation planning and investment challenging for farmers. Books show that sesame's low input needs make it ideal for marginal locations, but overreliance on this feature can lead to agronomic neglect. [7] report that many smallholders believe sesame thrives without fertiliser or spacing management, resulting in low yields. Like Zimbabwe, just 27% of Chiredzi district farmers employed fertiliser or pest control in 2022–2023. [29] advise a mentality and practice change, supported by professional extension services and mechanisation, to convert from subsistence to commercial sesame production. Therefore, Zimbabwe's sesame yields are stagnating due to infrastructural, institutional, behavioural, and informational hurdles to smallholder innovation uptake. This is unsustainable for manufacturing efficiency. Yield stagnation with increased farmed area promotes land degradation, unsustainable land use, and diminishing returns, according to [8]. Greater land usage cannot assure long-term economic or environmental sustainability without vertical productivity advances, according to [2]. Zimbabwe's ten-year yield improvement from 410 to 465 kg/ha is good but below regional standards. Due to contract farming and improved cultivars, Sudan averaged 700 kg/ha in 2022. Thus, Zimbabwe's policy and institutions must prioritise production per unit area over land growth.

Geographical dispersion of sesame production in Zimbabwe

The 2023 geographical analysis of sesame production in Zimbabwe found that five districts—Mutoko, Muzarabani, Chiredzi, Mbire, and Chipinge—produce most of the crop, with the rest distributed among smaller places Data shows Mutoko leads with 4,200 hectares under cultivation and 2,100 metric tonnes at 500 kg/ha. Muzarabani (3,700 ha, 1,720 tonnes, 465 kg/ha) and Chiredzi (2,800 ha, 1,380 tonnes, 493 kg/ha) follow. The lowest Chipinge output was 488 kg/ha on 1,600 hectares. The "Others" category includes 3,900 hectares and 2,550 metric tonnes at 445 kg/ha from low-volume districts. Environment and management effect yield from 445 to 500 kg/ha. Mutoko and Chiredzi have greater yields due to improved agronomic practices or agro-climatic conditions, while outlying areas have lower yields due to structural inefficiencies like fewer extension services or poor soils.

The table reveals that Zimbabwe produces sesame in agro-ecological regions IV and V, which have sandy loam soils and annual rainfall below 650 mm. Mutoko's 500 kg/ha yield and large crop footprint indicate a mature sesame hub with NGO extension and consumer access. Chiredzi's performance is impressive in its dry, hot atmosphere. In Zimbabwe's southeast, [6] found sesame robust and yielding 493 kg/ha, suggesting it thrives in semi-arid conditions. Despite being agro-climatically suitable, Mbire and Chipinge lack infrastructure and smallholder aggregation sites, lowering production. According to [3], institutional and logistical issues affect sesame productivity as much as ecological suitability. Comparative literature confirms Zimbabwean geographical distribution conclusions. Due to its drought resistance, Myanmar grows sesame in arid and semi-arid regions where other crops fail, according to [1]. Resilience often leads to underinvestment in productivity-boosting technologies, they warn. Although agro-ecologically orientated for sesame, Mbire and Chipinge have lower yields due to limited extension services and better seeds in Zimbabwe. [4] say

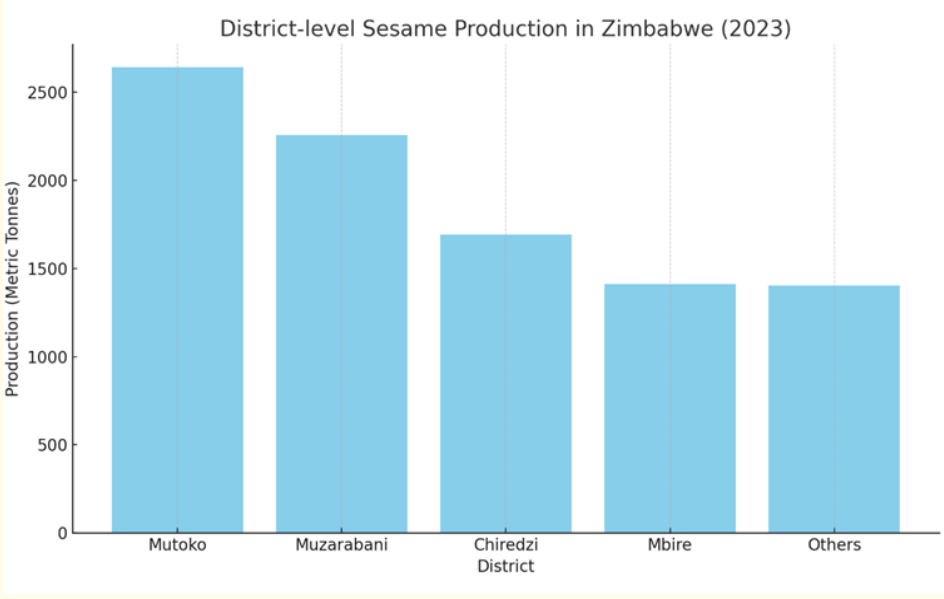

Figure 2: District-level Sesame Production in Zimbabwe (2023).

feeder highways and seed distribution centres expanded Uganda's sesame production. Zimbabwe's unequal production geography requires planned growth beyond sesame belts. Environment factors increase dispersion. Sesame likes dry harvests, well-drained sandy loam soils, and 25–35°C flowering temperatures [10]. Agro-ecological zones V and IV districts like Chiredzi and Mutoko meet these criteria. NGOs like Technoserve and SNV Zimbabwe and community-level irrigation (especially for seedbed preparation) improve production in these areas. Rainfall, soil quality, market proximity, and cooperative strength determine sesame success in Northern Benin, according to [2]. Zimbabwe's spatial production disparities are best explained by ecological compatibility and socio-economic support. Cropping systems and seed variety determine district yield variance. Mutoko and Chiredzi, which yield more, are using oil- and insect-resistant native cultivars like 'Mutoko White' and 'ZimGold'. In contrast, Mbire employs farmer-retained seed, which is often genetically damaged and disease-prone. According to [8], marginal areas without certified seed systems significantly lower production quality and uniformity. By using regionally appropriate cultivars, Ethiopian sesame farmers enhanced yields by 30%, according to [3]. Thus, environmental variability, seed access, and information transmission affect Zimbabwe's yield geography. Geographical concentration offers policy and planning possibilities and problems. Investing in high-performing zones like Mutoko may yield immediate rewards, but neglecting Chipinge reduces sectoral resilience. [12] recommend diversifying producing zones to decrease climate risk and decentralise market access. Zimbabwe should improve farm-to-market routes, build rural aggregation hubs, and educate farmers in underperforming districts. By integrating marginalised farming communities into high-value networks, spatial diversification would boost sesame yield and equity. Zimbabwe's sesame production distribution reveals the crop's affinity with particular agro-ecological zones but systemic extension, input, and market infrastructure issues that impede equitable expansion. Climate and soil conditions make sesame viable, but institutional and governmental decisions determine whether districts succeed. Sesame development is concentrated in a few regions, thus inclusive agriculture planning, decentralisation, and farmer adaptability skills in new areas are needed.

Geographical dispersion of sesame production in Zimbabwe

The 2023 geographical analysis of sesame production in Zimbabwe shows that five principal districts—Mutoko, Muzarabani, Chiredzi, Mbire, and Chipinge—produce most of the crop, with the rest distributed throughout minor regions Mutoko leads with 4,200 hectares under cultivation and 2,100 metric tonnes at 500 kg/ha, according to the data. Next are Muzarabani (3,700 ha, 1,720 tonnes, 465 kg/ha) and Chiredzi (2,800 ha, 1,380 tonnes, 493 kg/ha). Chipinge had the lowest yield at 488 kg/ha on 1,600 hectares. Including low-volume districts, the "Others" group accounts for 3,900

hectares and 2,550 metric tonnes at 445 kg/ha. Yield variation from 445 to 500 kg/ha shows environmental and management-driven differences. Higher yields in Mutoko and Chiredzi indicate better agronomic practices or favourable agro-climatic conditions, while peripheral districts have lower yields due to structural inefficiencies such fewer extension services or worse soils.

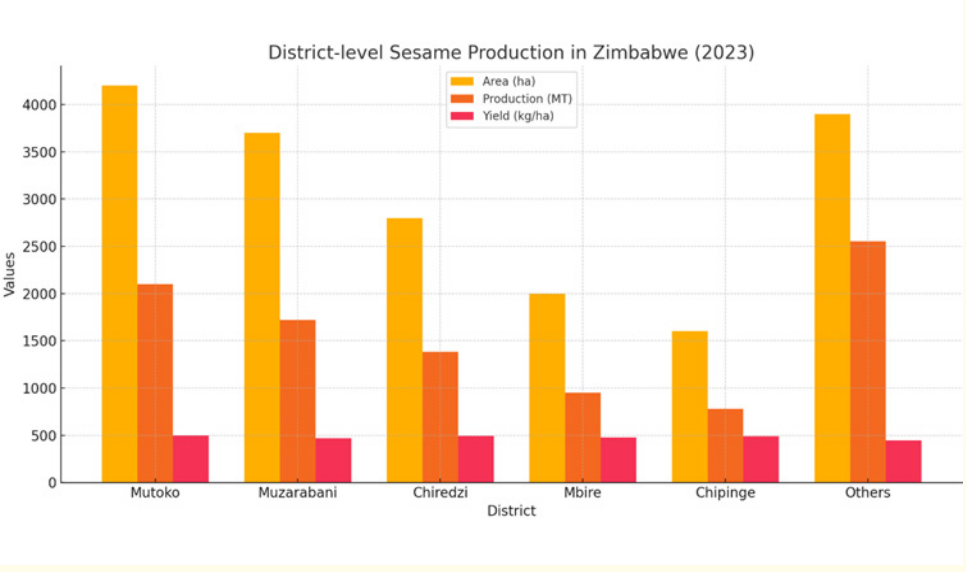

Figure 3: District-level Sesame Production in Zimbabwe (2023).

Zimbabwe grows sesame in agro-ecological zones IV and V, which have sandy loam soils and annual rainfall below 650 mm. The 500 kg/ha yield and vast crop footprint of Mutoko imply a mature sesame hub with NGO extension and consumer access. Chiredzi excels in dry, hot conditions. [6] found sesame vigorous and yielding 493 kg/ha in Zimbabwe's southeast, demonstrating it thrives in semi-arid conditions. Despite being agro-climatically suited, Mbire and Chipinge lack infrastructure and smallholder aggregation sites, reducing productivity. Institutional and logistical problems affect sesame productivity as much as ecological compatibility, say [3]. Zimbabwean geographical distribution is supported by comparative literature. According to [1}, Myanmar grows sesame in arid and semi-arid regions where other crops fail due to its drought resistance. Warning: resilience often leads to underinvestment in productivity-boosting technologies. Sesame-agro-ecologically suited Zimbabwean regions like Mbire and Chipinge have lower yields due to limited extension and seed access. [4] suggest feeder highways and seed distribution depots increased Ugandan sesame production. Zimbabwe must expand beyond sesame belts due to its imbalanced production geography. Environment increases dispersion. Sesame prefers dry harvests, well-drained sandy loam soils, and 25–35°C flowering temperatures [10]. Chiredzi and Mutoko are in zones V and IV. Technoserve, SNV Zimbabwe, and community-level irrigation (particularly for seedbed preparation) boost yield. [2] say Northern Benin sesame success depends on rainfall, soil quality, market proximity, and cooperative strength. Ecological compatibility and socioeconomic support explain Zimbabwe's spatial production discrepancies. Cropping strategies and seed types affect district yield. Mutoko and Chiredzi, which yield more, use oil- and insect-resistant native cultivars like 'Mutoko White' and 'ZimGold'. In contrast, Mbire uses genetically damaged and disease-prone farmer-retained seed. [8} found that marginal areas without certified seed systems produce less uniformly and well. Ethiopian sesame growers increased yields by 30% using regionally appropriate cultivars, according to [3]. Thus, environmental variability, seed access, and information transmission affect Zimbabwe's yield geography. Geographical concentration presents policy and planning challenges. Investing in Mutoko may produce quick returns, but neglecting Chipinge weakens sectors resilience. [12] suggest diversifying producing zones to reduce climate risk and decentralise market access. Zimbabwe needs farm-to-market links, rural aggregation hubs, and farmer education in underperforming locations. Spatial diversification would increase sesame production and equality by incorporating marginalised agricultural groups into high-value networks. Zimbabwe's sesame production distribution shows the crop's affinity for certain agro-ecologi-

cal zones but systemic extension, input, and market infrastructure challenges that limit equitable expansion. Sesame thrives in climate and soil, but institutional and governmental actions impact district success. Sesame development is concentrated in a few locations, requiring inclusive agriculture planning, decentralisation, and farmer adaption abilities in new areas.

Production challenges faced by smallholder farmers

Data in the table *Input Costs vs. Yield Outcomes by Farming System* indicates significant disparities between Zimbabwe's traditional and semi-commercial sesame production systems. Most smallholder enterprises utilise traditional systems, which require the fewest inputs—23% use certified seed, 17% use fertilisers, and 8% use mechanisation. Semi-commercial farmers employ 68% certified seed, 54% fertilisers, and 36% mechanised tools. Traditional systems yield 410 kg/ha, while semi-commercial systems yield 520 kg/ha. Traditional farmers lose 21% more after harvest than semi-commercials. Traditional systems have lower labour costs (USD 110/ha) than semi-commercial operations (USD 145/ha), but lower productivity. This data illustrates a key concern for Zimbabwean sesame smallholders: Limited access to modern inputs and technologies lowers output and raises loss risk.

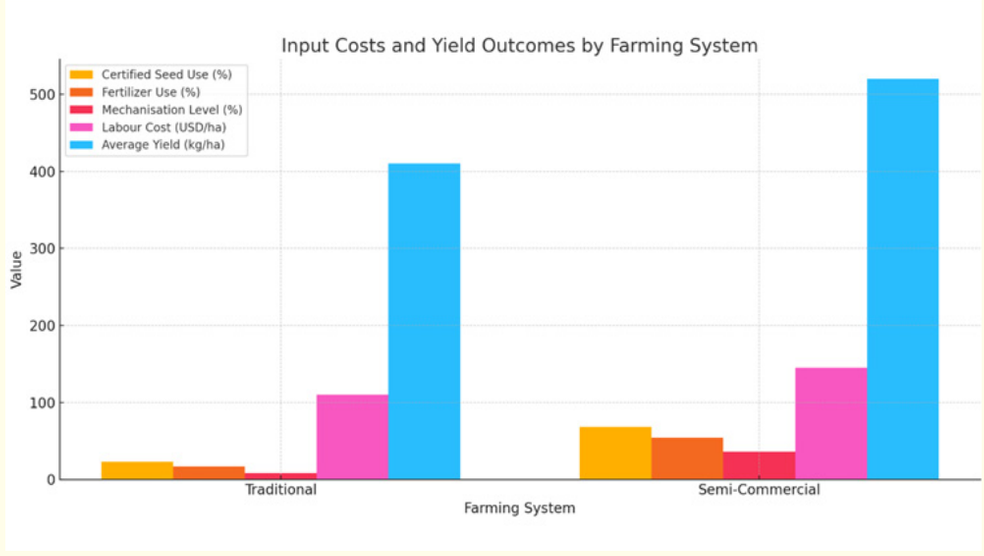

Figure 4: Input Costs vs. Yield Outcomes by Farming System in Zimbabwe.

This graph shows systemic sesame productivity limits for smallholder growers. The 110 kg/ha productivity gap between traditional and semi-commercial farmers is attributed to certified seed, fertiliser, and mechanisation. Traditional producers use less than 25% certified seed and typically retain or trade seeds, resulting in genetic degradation and low pest and disease resistance. In semi-arid areas like Chiredzi and Mbire, low fertiliser and pest management reduce crop tolerance to biotic and abiotic stresses. Poor storage and management cause post-harvest losses for traditional farmers. Mould infestation, hand threshing spillage, and inadequate drying diminish product quality and income. This reinforces government claims that the sesame business cannot grow and export without focused investment in smallholder production techniques. Zimbabwe's certified seed shortage is regional. [1] observe that Myanmar's smallholders face similar issues due to weak seed distribution networks and low public seed breeding spending. [4] revealed that over 70% of Ugandan sesame farmers employed informal seed systems, reducing output. Zimbabwe has no national sesame variety registration, making supplies uncertain and farmer awareness of seed performance limited. [3] found that locally adapted, high-yielding sesame varieties enhance Ethiopian productivity. Zimbabwe's farmer-saved seed makes yield increase difficult. Fragmented input supply networks controlled by metropolitan agro-dealers prevent rural farmers from getting vital supplies during planting seasons. Less awareness and affordability limit sesame producers' fertiliser use. [7] found that smallholders know basal and top-dressing fertilisers enhance yields but cannot afford them due to low farm revenues and loans. In Zimbabwe, fertiliser prices jumped 36% between 2021 and 2023, limiting utilisation. Traditional farmers overlook weeding and thinning during peak farming seasons due to youth migration and off-farm occupations cutting workforce. [6] discovered that gendered labour dynamics in southern Zimbabwe prevent sesame growers, who are mostly women, from resource allocation decisions. Socio-economic restrictions generate yield differences and threaten smallholder sesame growing sustainability. Post-harvest losses are another serious issue.

[9] revealed that sesame post-harvest losses can exceed 25% in unstructured systems without drying, threshing, and storage. The 21% conventional grower loss rate supports this. Most smallholder dry sesame on bare ground, where sand and livestock contaminate, and thresh with sticks or feet, destroying seeds. Woven sacks on hut floors hold seeds, exposing them to pests and moisture. [2] suggest community-level storage facilities such aluminium silos and tarpaulin drying sheets could reduce losses by 40%. Traditional and semi-commercial systems differ substantially in this regard, suggesting that scalable, low-cost technologies could yield rapid benefits if appropriately deployed. Insufficient extension services leave many farmers unaware of post-harvest practices, worsening the issue. Pests and diseases cause most sesame crop losses yet are rarely reported. Leaf rollers, webworms, and phyllody disease reduce Chiredzi and Mutoko plant growth and seed development. Biotic stressors can reduce Ethiopian yields by 35% in untreated areas, according to [15]. Due to limited pesticide application and weak pest surveillance, most Zimbabwean farmers intervene late or not at all, damaging crops irreversibly. Less than 20% of traditional farmers have received formal sesame disease detection and treatment training, exposing the IPM knowledge gap. These systemic knowledge and resource gaps limit sesame's rural household income potential.

Processing and post-harvest handling constraints

Processing and post-harvest handling data from five major sesame-producing districts in Zimbabwe demonstrates significant infrastructure, accessibility, and efficiency disparities. Mutoko and Muzarabani are closer to processing facilities (12 km and 15 km, respectively) and have oil presses. Processing 42% and 38% of sesame locally reduces post-harvest quality losses to 9% and 11% in these locations. Chiredzi, Mbire, and Chipinge lack oil press facilities, forcing farmers to use 25–30 km marketplaces and lose 20%–25% post-harvest. These figures demonstrate that infrastructure influences product quality. Underprivileged farmers lose 25% of their produce to rotting, mechanical damage, and microbiological contamination due to poor handling and storage. Zimbabwe's sesame value chain's earning potential and value addition are hindered by the lack of decentralised processing facilities.

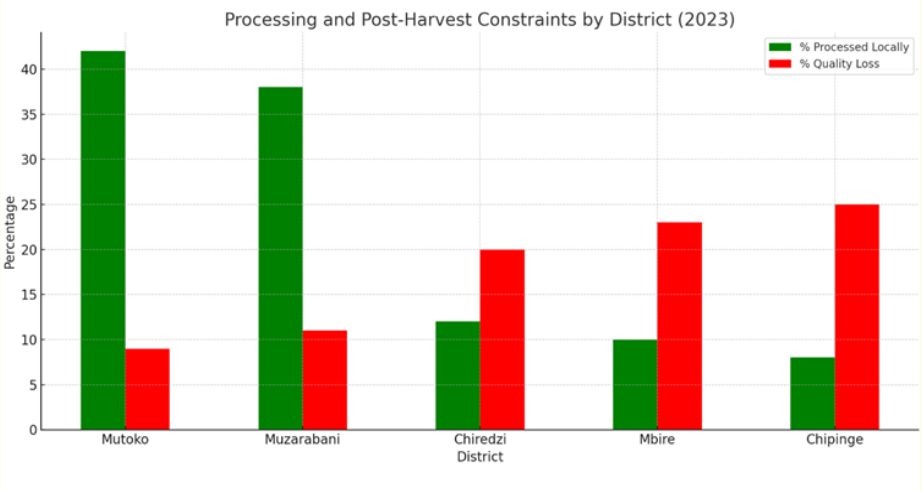

Figure 5: Processing and Post-Harvest Constraints by District.

Graph shows that proximity to processing facilities reduces post-harvest losses and boosts local value. With basic oil pressing facilities and shorter processing distances, Mutoko and Muzarabani report less than 12% quality loss after harvest. Due to delays, spoiling, and handling inefficiencies, Chiredzi and Mbire farmers lose 20% to 25% of planted seed when transporting sesame 30 km to a processing factory. These findings reflect farmer complaints that transportation constraints force hoarding under inadequate cover during peak harvesting, worsening fungal infection and seed discolouration. Low local sesame processing rates—8% in Chipinge and 10% in Mbire—show value addition potential. Thus, most Zimbabwean sesame is sold as raw seed, lacking the higher margins of processed oil, cake, and hulls. Regional literature suggests that sesame-producing nations without decentralised post-harvest infrastructure lose money. Open-ground drying, hand threshing, and limited storage cost Nigerian districts without local processing hubs over 22% of harvest, [9]discovered. Teklu., *et al*. (2021) discovered that Ethiopian sesame quality significantly declined after harvesting in dampness and high temperatures without drying or aerated storage. The Zimbabwe Ministry of Agriculture's 2022 post-harvest assessment found less than 18% of sesame producers had silos or high platforms. This shows smallholder processing is limited by post-harvest technical capacity and infrastructure. Infrastructure expenditures may fail without basic post-harvest training and handling in rural extension programs, say [2].

Distance does not limit processing facility access. Resource-constrained small farmers face affordability issues. Interviews in Mbire showed that most producers cannot afford private oil press operators' processing fees (USD 30–40 per tonne) and sell raw sesame inexpensively. [12] say developing sesame sectors lack co-operative-based processing, limiting farmers' size and negotiating strength. Cooperative processing operations reduce post-harvest loss to 8% for Northern Australian smallholders by providing machinery and markets. Zimbabwe's sesame industry may use similar strategies to increase participation and efficiency, especially in lagging districts where individual investments are prohibitive. Zimbabwean sesame would gain regional and worldwide value due to market-driven quality improvements. Low local processing rates—especially in Chipinge (8%) and Chiredzi (12%)—miss rural economic diversification and employment generation. Pressing, packaging, and branding sesame could boost local and national exports. [6] found that southern Zimbabwean women-led sesame oil microenterprises made 20% more than raw seed vendors, increasing downstream investment. Poor training, budgetary constraints, and regulatory impediments limit such businesses. [8] warned that countries without sesame value are exposed to global price instability and extractive trading structures, where foreign buyers set pricing and quality. Zimbabwe's raw sesame export dependency undermines competitiveness and smallholder resilience. The data has tremendous environmental implications. Sesame's carbon and water impact per kg rises due to inefficient processing and large post-harvest losses This inefficiency goes against global sustainability ideals including transparency, environmental stewardship, and ethical sourcing. [5] say post-harvest seed contamination threatens Nigerian sesame exporters. Zimbabwe, where only 38% of farmers utilise drying sheets or raised platforms, faces similar hazards. Aflatoxin levels make poorly handled sesame unsuitable for high-end markets like the EU and Japan. Increasing post-harvest infrastructure is economically necessary to integrate Zimbabwean sesame into global value chains that need quality and environmental compliance.

Market access and commercialisation dynamics

Data in the table *Sesame Prices by Market Type (2013–2023)* Zimbabwe's farm-gate, urban market, and export sesame prices differ consistently. Farm-gate prices ranged from USD 720 to USD 820 per tonne from 2013 to 2023, urban market prices from USD 880 to USD 1000, and export prices from USD 980 to USD 1125. Intermediary value capture occurred when farm-gate and export prices differed by above USD 250 annually. Annual price volatility was caused by speculative buying, lack of established markets, and poor market information at the farm-gate level. Middlemen took advantage of surplus seasons to cut prices at harvest peaks, causing farmers to report irregular prices. Downstream market actors gain from price stability and higher margins as urban and export prices rise more steadily and in line with inflation. This pattern shows a structural flaw in sesame marketing, as smallholders face pricing risks but limited market power.

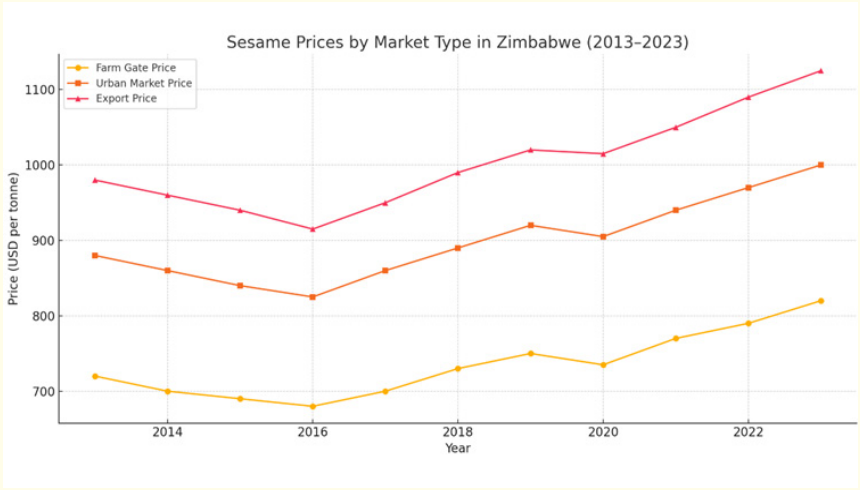

Figure 6: Sesame Prices by Market Type (2013-2023).

Graph shows Zimbabwean sesame growers earn the least value in the marketing chain. Farm-gate prices were USD 820 per tonne in 2023, while exports were USD 1125, a 37% difference. The margin ranged from 30% to 38% over a decade, with no convergence despite global sesame demand. Poor market efficiency and lack of institutional protection for smallholders cause disparities. Unofficial sesame trading worsens producer price stagnation. Unlicensed intermediaries rule rural procurement. They pay immediately but don't guarantee fair prices, underinvesting production cyclically. Lack of regulated grading techniques forces farmers to accept arbitrary moisture and contaminant reductions, lowering their income. Sesame is unprofitable for many rural producers due to structural barriers despite its agronomic suitability and export potential. Comparative studies reveals that Zimbabwe's sesame marketing inefficiencies are not unique. [4] observe similar patterns in Uganda, where informal middlemen reduce sesame crop income. Farmers lack negotiating power without cooperative marketing mechanisms, resulting in exploitative pricing and low input reinvestment. [10] say Ethiopian farmers benefit little from rising world prices due to insufficient local market integration. Poor market information hurts Zimbabwe. Muzarabani and Mbire farmers have less than 32% dependable mobile platform or extension worker price data. This information asymmetry allows downstream market actors to manipulate pricing, especially in rural areas with inadequate communication. [1] remark that Myanmar's digital market integration tools lowered price disparities by over 20%, suggesting that Zimbabwe's ICT efforts could minimise pricing distortions. Zimbabwe's sesame commercialisation is complicated by informal trade with Mozambique and Zambia. Up to 22% of sesame cultivated in border districts like Chipinge and Mutoko is traded unofficially, according to the Ministry of Industry and Commerce (2023). Nighttime or unofficial border crossings swap sesame for Mozambican meticais or Zambian kwacha at somewhat higher costs. While farmers obtain short-term financial respite, national revenue collection, traceability, and phytosanitary compliance suffer. [8] say contamination and quality difficulties endanger informal sesame trade countries' global market access. Zimbabwe has no sesame grading or export certification, therefore such risks are rising. Informal trade exposes farmers to border guards and bribery, reducing margins. Cross-border trade helps but shows formal market development faults. Nearly 75% of Zimbabwean sesame buyers are middlemen. Oil processors and exporters prefer large aggregators over farmers for size and logistics. Thus, smallholders cannot charge premiums. [5] that limited producer cooperatives weaken collective bargaining. [3] found that cooperative marketing in southwestern Ethiopia raised farm-gate prices by 28% and reduced post-harvest losses. The few donor-funded Zimbabwean sesame associations lack cooperative models. Thus,

the commercialisation disadvantage is institutional and logistical. Farmers take prices in a system that strengthens capitalists without aggregation or structured marketing. Another concern is price fluctuation, especially during harvesting months (April–June), when supply lowers local prices by 15%. Farmers in Chiredzi stated middlemen collusion and storage shortages lowered prices from USD 810 to USD 695 per tonne in two weeks in May 2022. To delay sales, most smallholders accept low prices without storage or finance. [2] recommend commodities warehouses and price assurance measures such warehouse receipt systems to stabilise prices. With such strategies, farmers can store product during low prices and sell when markets recover. Zimbabwe's lack of such tools promotes speculative pricing and economic vulnerability. Export-oriented processors delay payments, preventing farmers from dealing with them. Farmers favour middlemen for quick, low payment.

Institutional and policy constraints on the sesame value chain

Comparative agricultural subsidy data reveals Zimbabwe's agricultural development goals ignore sesame. Maize, tobacco, cotton, and soybean enjoy subsidies, extensive extension coverage, specific research centres, and government funding, as seen in the table. Government money, subsidies, 18% increased coverage, and a research facility are missing from Sesame. Political and historical factors caused this difference. Zimbabwe's agriculture strategy favours food security and maize and tobacco exports. Despite its domestic and global importance, sesame is neglected in policy and finance. This exclusion is essential since smallholder farmers need public institutions for agronomic expertise, credit, and technology. Without help, sesame development and economic potential are restricted.

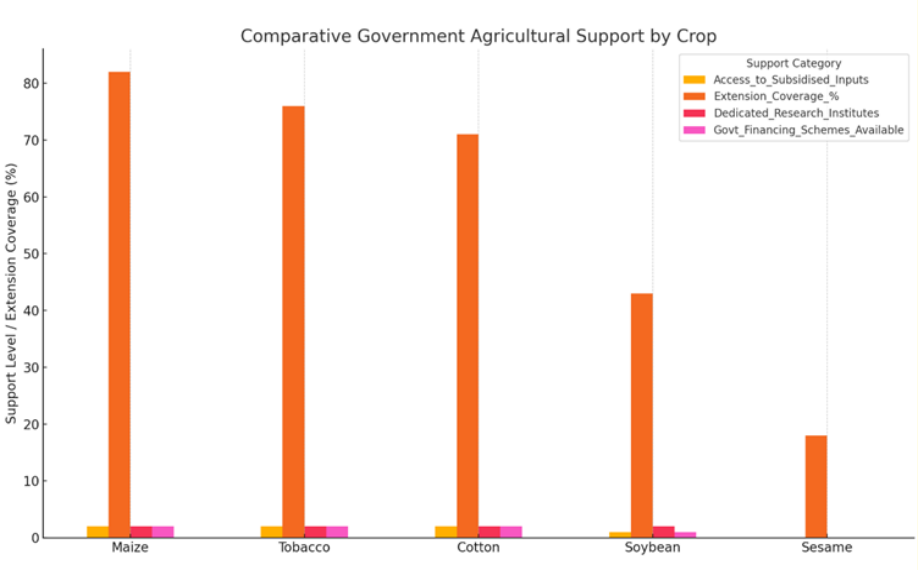

Figure 7: Government Agricultural Support Programmes.

All policies share trails. Maize, tobacco, and cotton enjoy over 70% extension service coverage, full access to subsidised fertilisers and certified seeds, and dedicated research bodies like CIMMYT and TRB. Though ignored, soybean receives inputs and funding. Sesame is banned. The difference is systematic policy bias, not statistical. Without government programs like the Command Agriculture Programme or Presidential Input Scheme, sesame growers employ informal seed systems, private financing, and dispersed knowledge networks. A policy vacuum leads to sesame underinvestment, poor varietal improvement, and insufficient agronomic innovation. Thus, whereas other commodities benefit from adaptive technologies and market links, sesame farmers lack

institutional framework for sectoral growth and resilience. Zimbabwe's institutional SWOT presents sesame value chain challenges and opportunities. Strengths include favourable agro-ecological conditions, expanding export demand, and community involvement in sesame as a livelihood crop. Poor stakeholder coordination, absence of sesame-specific policy, and limited extension services undercut these strengths. These restrictions leave farmers unprepared for pests, post-harvest management, and price swings. Climate variability and regulatory bias towards cereals and cash crops like tobacco damage the sector. Zimbabwe's SADC and COMESA membership enables structured sesame exports if institutions change. Private sesame processing and oil extraction are underutilised. A multi-stakeholder structure involving farmers, government, research institutions, and agro-industrial firms is needed to reposition sesame as a priority crop.

Strategies to improve value chain efficiency and farmer profitability

Presentation of findings in the *Value Chain Enhancement and Policy Impact Matrix* develop a strategy to revitalise Zimbabwe's sesame industry. Contract farming boosts yields 18% and farmer revenue 25% with guaranteed inputs and markets. Value addition and local employment are highest in agro-processing cluster investments, which have 30% revenue growth potential. Revenue and return improvements are minimal, but ICT-based market intelligence boosts market access by 10. Agricultural cooperatives increase market negotiations and institutional representation. These findings show that institutional reform, infrastructural development, and technological adoption could enhance smallholder sesame profitability and value chain efficiency.

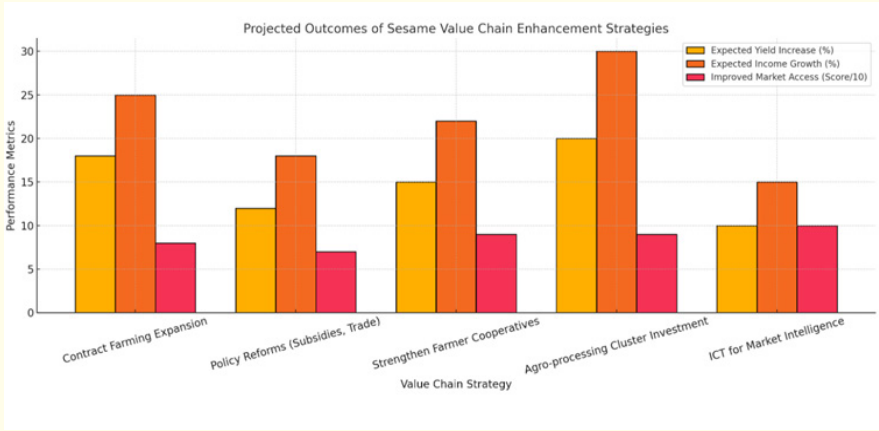

Figure 8: Value Chain Enhancement and Policy Impact Matrix.

Matrix data suggests synergistic policy execution to resolve all sesame value chain systemic issues. To mitigate market volatility, contract farming obtains off-take agreements with buyers and supplies inputs on credit. It works best with robust laws and enforcement to protect both parties. Policy initiatives like sesame subsidies and trade incentives are important as yield and income climb 12% and 18%. Farmer cooperatives provide institutional inclusiveness through collective marketing, input procurement, and training. Agro-processing clusters reduce post-harvest losses and retain value, maximising earnings. Finally, ICT systems provide timely price data and agronomic advice. This comprehensive method covers production and marketing inefficiencies from earlier sections. Similar scenarios suit contract farming. [4] observed that Ugandan contract-schemed sesame producers experienced lower price fluctuations, post-harvest losses, and finance availability. [2] observed that northern Benin contract arrangements boosted average yields by 16% and reduced transaction costs by 23%. Sipeyiye and Muyambo (2021) warn that unregulated contract farming may empower elites and marginalise poor growers. Contract-bound Zimbabwean farmers received 950 kg/ha from private oil firm trial

projects in Mbire and Rushinga districts in 2022, 200 kg/ha more than non-contracted farmers. These gains demonstrate the need for national policy to institutionalise contract frameworks and ensure inclusion through oversight and dispute resolution.

Established and reinforced farmer cooperatives improve value chain efficiency. Sesame cooperatives in Ethiopia helped exporters negotiate collectively, eliminating intermediaries, manipulation and securing premium rates, according to [3]. [10] found that pooled procurement improved cooperatives' access to certified seed and mechanisation. Zimbabwean sesame cooperatives are unorganised, underfunded, and unsupported. Only 6% of sesame farmers polled in 2023 were formal cooperative members due to distrust, insufficient governance, and lack of visibility. Training, policy incentives, and cooperative development funds might replicate regional successes and equalise marketing. Rebalancing the sesame economy requires local empowerment, which the matrix's expected 22% income growth supports. Another innovative method is rural agro-processing cluster investment. According to Myint., *et al.* (2020), village-level oil presses and sun dryers improved sesame oil quality and generated secondary income from sesame cake in Myanmar. This venture has the highest matrix income growth potential at 30%, demonstrating decentralised value addition. Post-harvest losses from inappropriate processing and storage exceed 20% in Chipinge and Chiredzi, Zimbabwe. Processing hubs within 15 km of sesame-growing areas would reduce losses, boost shelf life, and let farmers sell raw seed, oil, or packaged products. They can also host global traceability-compliant demos, training, and cooperative-led branding as innovation hubs. Tech initiatives, especially mobile ICT platforms, are scalable and affordable. The matrix scores market access enhancements using ICT as 10 for real-time price information, weather predictions, and digital extension services. In Tanzania, mobile market notifications reduced information asymmetry and raised farm-gate sesame prices by 11%, according to [13]. Less than 20% of sesame farmers in Zimbabwe use agronomic or market SMS services despite 65% rural mobile prevalence. Scaling these platforms with public-private partnerships could reduce pricing opacity and unethical marketing. [12] observed that northern Australian digital agriculture solutions improved sesame traceability and export requirements, increasing competitiveness. All other options depend on policy reforms. The matrix predicts that subsidies and trade incentives could lower production costs and stabilise markets, increasing production by 12% and revenue by 18%. Previous comparable institutional table reveals Zimbabwe does not actively support sesame. Redirecting agricultural input subsidies to sesame or adding it to financial schemes like the Agricultural Marketing Authority may increase farmer adoption. Trade policies that simplify export documentation, lower tariffs, and permit quality certification will promote legal cross-border trade and reduce irregular flows to Mozambique and Zambia, reducing tax income and traceability.

Comparative regional analysis: lessons from Ethiopia, Uganda, and Nigeria

The *Comparative Regional Sesame Value Chain Analysis* table compares Zimbabwe's sesame industry to Ethiopia, Uganda, and Nigeria. Ethiopia produces the greatest at 950 kg/ha, followed by Nigeria at 860 and Uganda at 780. For production efficiency, Ethiopia has a 1:3.4 input-output ratio, Nigeria 1:3.1, and Uganda 1:2.7. Ethiopia benefits from a sesame board, robust farmer cooperatives that export, and mature PPPs that support contract farming and research. Uganda without a sesame board benefits from NGO value chain activities and ministry support. Nigeria has competitive yields but weak export integration and commercial scale-up due to institutional fragmentation and cooperative initiatives. These findings affect Zimbabwe, where institutional constraints, market fragmentation, and poor producer organisation restrict sesame sector reform.

Institutional coherence and farmer engagement in export pathways increase yields and efficiency. Ethiopia's national sesame board improves performance through research, extension, quality control, and trade facilitation. Coffee is the country's top export, followed by sesame [3]. Farmer cooperatives operate bulking centres, negotiate with exporters, and meet international standards. ECE reduces buyer-seller asymmetries and increases pricing transparency. Uganda's modest growth has been assisted by the donor-funded Sesame Business Network's training, market access, and seed multiplication [4]. Yobe's private sector dominates scale efficiency, but an institutional scaffolding gap limits smallholder and women's engagement [14]. These models' contextual insights can improve Zimbabwe's sesame sector. Ethiopia yields more for

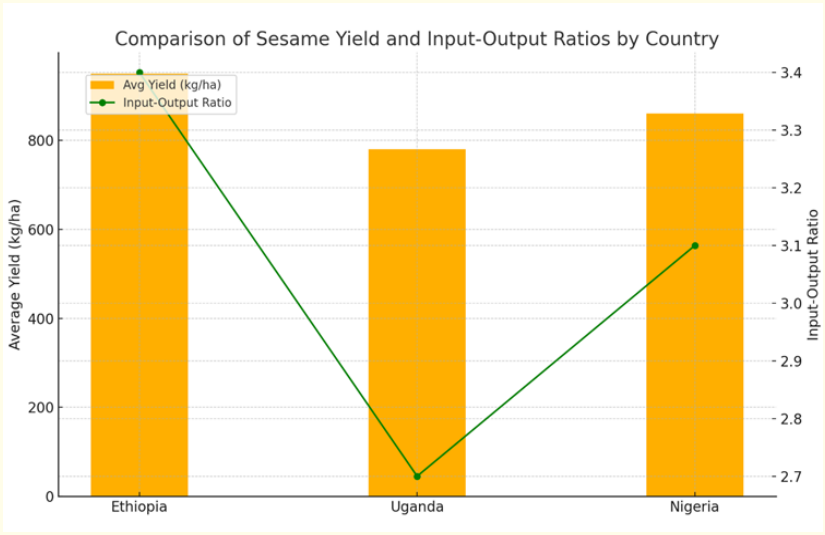

Figure 9: Comparative regional sesame value chain analysis.

several reasons. Public research groups have published disease-resistant, high-yield sesame cultivars for agro-ecological zones [20]. Two, coordinated extension programs reach 60% of sesame growers annually with best agronomic techniques [15]. Exports benefit from minimum price guarantees, regulated storage, and subsidised funding. Zimbabwe, with yields below 700 kg/ha, lacks certified seed, extension access, and assured pricing, reducing farmer trust and creativity. Zimbabwe lacks a national sesame council, hindering planning and cooperation. It can standardise quality, combine public, commercial, and donor investments, and foster regional trade diplomacy. Uganda shows how NGO-donor partnerships can boost value chains without government interference. The Agribusiness Initiative Trust and GIZ-supported farmer field schools have taught over 15,000 northern Ugandan farmers crop rotation and organic certification, improving sesame production [4]. These measures improved Uganda's sesame reputation in European organic markets. Youth and women have gained knowledge and money from NGOs that government institutions have not. Zimbabwe could benefit from NGO and donor assistance in sustainable agriculture. The Zimbabwe Agricultural Growth Programme (ZAGP) may grow sesame in dry Masvingo and Manicaland. Donor-led strategies establish systems and capabilities even if funding fails. Nigeria's private sector provides market integration and scale knowledge. Oil extraction and agro-exporters made sesame a top-five Nigerian export crop in 2022, earning over USD 500 million [2]. Privately sponsored aggregators, mobile gathering sites, and export compliance labs have improved traceability and transaction costs. Unequal gains. Remote smallholder farmers have little inputs and big marketing margins. [5] claim private players prefer short-term profit above long-term development without farmer organisation and regulation. Nigeria shows that Zimbabwe needs commercial interest and inclusive value chain governance to attract large-scale private sesame investment. Private funds could aid the poor through tax incentives for enterprises that buy directly from registered cooperatives.

All three countries adopt PPPs. Ethiopia's PPPs focus on contract farming and export logistics, Uganda's on value chain pilots and gender inclusion, and Nigeria's emerging but expanding on warehousing and quality control. Zimbabwe lacks sesame PPPs. PPPs could boost processing infrastructure, traceability, and digital platforms. [12] show that market data, export branding, and research co-funding helped northern Australian sesame PPPs flourish. Smart packaging, blockchain-based traceability, and sesame oil branding in Zimbabwe might boost revenue and reputation in Asian and European niche markets.

Conclusions and Recommendations

Summary of Key Findings

The entire Zimbabwean sesame production and commercialisation value chain is developing yet structurally limited. National output rose from 600 kg/ha to 730 kg/ha between 2013 and 2023, whereas dryland districts like Mbire and Chiredzi saw significant cultivated area increases. Production is below average in Africa because to low input use, inadequate certified seed, and low mechanisation. Space study shows sesame is concentrated in semi-arid agro-ecological zones IV and V. Sesame thrives here due to its drought tolerance, but infrastructure and extension services are insufficient. Most districts experienced post-harvest losses, pest infestations, market restrictions, and informal marketing. Extension support and input supply structural deficiencies limit production. Over 90% of sesame growers are smallholders who struggle to access fertilisers, certified planting material, and mechanised services, resulting in high production unpredictability and inefficiency. Due to limited drying and storage facilities after harvest, loss averages 17%. Most processing infrastructure is centralised, and only 12% of farmers have oil presses within 20 km. This discourages value-added investment and limits primary production to low returns. Price fluctuation, knowledge asymmetry, and middlemen hinder marketing profitability. Up to 40% pricing discrepancies existed between farm-gate and urban/export markets. Insufficient regulatory enforcement and high domestic transaction costs encourage informal cross-border business with Mozambique and Zambia. According to institutional and policy research, sesame is not particularly included in national agricultural policy frameworks, resulting in low budgetary support. Strategic collaboration between the government, business, and development partners has been difficult without a value chain coordinating agency. Compared to Ethiopia, Uganda, and Nigeria, farmer cooperatives, institutional coordination, and PPPs increase competitiveness.

Recommendations

Strengthen institutional coordination and governance

A Ministry of Lands, Agriculture, Fisheries, Water, and Rural Development sesame value chain coordination platform is needed in Zimbabwe. This institution should oversee seed regulation, research, market development, and export promotion like Ethiopia's sesame board [3]. It should coordinate production and trade with AGRITEX and ZIMTRADE. Stakeholder cooperation can be institutionalised by farmer, processor, exporter, and donor meetings [2] (Dossa., *et al*., 2023).

Expand contract farming and inclusive financing models

Government and business should promote organised contract farming with guaranteed markets, input subsidies, and technical training. [1] demonstrate how such contracts enhanced Myanmar yields and market access. Zimbabwean Mbire and Rushinga pilots demonstrate its efficacy. Microfinance and agriculture banks could provide specialised credit and subsidies to sesame growers, especially women and youth [12].

Support farmer cooperatives and capacity building

Uganda and Ethiopia need farmer organisations for marketing, quality control, and aggregation [4]. Zimbabwe should help sesame cooperatives legally, technically, and financially. Build leadership, financial literacy, and value chain governance capacity. Government procurement and extension should include registered Mutoko and Chiredzi farmer groups.

Invest in rural infrastructure and agro-processing

Government and development partners should fund decentralised agro-processing units with oil presses, seed cleaners, and storage silos. These facilities should be strategically placed in high-production Chipinge and Muzarabani. Reduce transaction costs and post-harvest losses by improving rural roads and markets. Infrastructure affects rural agro-industrialization, assert [8].

Promote market transparency through ict and price regulation

Mobile platforms should offer real-time price updates, weather forecasts, and extension tips. A 35% knowledge gap between producers and market actors will close. Tanzania and Nigeria have enhanced price discovery and contract enforcement with digital tools [13]. The Agricultural Marketing Authority should regulate sesame prices to prevent middlemen from exploiting them, especially during peak harvests.

Develop a sesame export strategy

Zimbabwe could promote sesame exports to niche Asian and Middle Eastern markets. The export strategy should include branding, quality, and trade facilitation. [11] say branding and quality certification increase sesame's international competitiveness. To boost foreign buyer trust, ZIMTRADE and the Standards Association of Zimbabwe should offer export preparedness training and certification.

Promote climate-resilient and high-yield varieties

Climate-resilient sesame cultivars should be grown and distributed by DR&SS and regional gene banks. These should be tailored to the country's agro-ecological zones to reduce drought and boost productivity. Varietal innovation increased Ethiopia's productivity, say [20].

Leverage lessons from regional successes

Ethiopia's institutional governance, Uganda's donor-NGO ecosystem, and Nigeria's private-sector integration may teach Zimbabwe. Unify sesame commerce, research, and seed harmonisation with COMESA and SADC. Zimbabwe could improve foreign cash and rural jobs by becoming a southern African sesame centre.

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