

Unravelling the Constraints Associated with Groundnut Marketing: A Comprehensive Review

Abstract

This review identifies and analyzes constraints in groundnut marketing systems, particularly for smallholder farmers in developing regions. It proposes strategies to enhance efficiency, profitability, and sustainability, thereby improving farmers' livelihoods. A comprehensive literature review of academic journals, policy reports, and case studies identifies key constraints in groundnut marketing. The review utilizes a structured conceptual framework that encompasses supply chain structure, market dynamics, institutional and policy environments, socioeconomic factors and draws on theoretical foundations such as Transaction Cost Economics, Value Chain Analysis, Market Structure-Conduct-Performance Paradigm, Rural Livelihoods Framework, and Supply Chain Risk Management. The study also applied economic and supply chain management theories to groundnut marketing, emphasizing the relevance of Transaction Cost Economics, Value Chain Analysis, and the Market Structure-Conduct-Performance Paradigm. This theoretical framework can be adapted for other agricultural commodities facing similar constraints. The review identifies critical constraints in groundnut marketing, including fluctuating market prices, inadequate storage facilities, limited access to credit, lack of market information, and high transaction costs. These are exacerbated by poor infrastructure, fragmented supply chains, and socioeconomic barriers, indicating the need for holistic, context-specific interventions. The review suggests practical interventions including investment in infrastructure development, enhancing market information accessibility through digital platforms, fostering farmer cooperatives, and implementing price stabilization mechanisms. These measures can empower smallholder farmers, improve market access, and increase profitability. Policymakers, development agencies, and private sector stakeholders can leverage these insights to formulate targeted support programs for groundnut farmers.

Keywords: Groundnut marketing, marketing constraints, smallholder farmers, market access, post-harvest losses, institutional support

1. Introduction

Groundnut, also known as peanut or *Arachis hypogaea*, is one of the most vital cash crops globally, serving as a significant source of protein, edible oil, and essential nutrients for millions of people [1,2]. Its cultivation spans diverse agroecological zones, making it a staple in the agricultural landscape of many countries, particularly in Africa and Asia [3]. The prominence of groundnut in global trade and food security initiatives underscores its socioeconomic significance [4,5]. Moreover, groundnut farming contributes substantially to the livelihoods of millions of farmers worldwide [6,7]. Its cultivation not only provides income for farmers but also supports broader economic development goals. Improving agricultural marketing systems is essential for enhancing the livelihoods of rural farmers and achieving broader economic development goals [8,9,10].

Groundnut marketing encompasses a range of activities from production to consumption [11], involving various stakeholders such as farmers, traders, processors, and consumers. The efficiency and effectiveness of groundnut marketing systems significantly impact the livelihoods of these stakeholders and the overall development goals of producing regions [12]. Despite its agricultural importance, the groundnut sector **grapples with multifaceted challenges, particularly concerning its marketing dynamics .in [13]. Research has shown that groundnut growers face numerous constraints, including fluctuating market prices, inadequate storage facilities, limited access to credit, and a lack of market information [14].** These challenges can result in significant post-harvest losses and reduced profitability for farmers. Furthermore, the marketing channels for groundnuts are often characterized by a high degree of fragmentation [15], with multiple intermediaries involved in the supply chain, which can reduce the share of profits that reach the primary **producers [16,17,18]. Identifying the constraints associated with groundnut marketing is crucial for understanding the barriers that hinder efficient market participation and limit the income**-generating potential of groundnut growers [19,20].

Research Questions

1. What are the key constraints faced by smallholder farmers in the groundnut marketing system, and how do these constraints impact market efficiency and farmer incomes in developing regions?
2. What strategies and interventions can be proposed to overcome the identified constraints and enhance the efficiency, profitability, and sustainability of groundnut marketing for smallholder farmers?

These questions will guide the research toward identifying specific challenges within the groundnut marketing system and exploring practical solutions to address these issues.

2. Conceptual Framework

A conceptual framework for understanding the constraints in groundnut marketing is structured around the following key components:

1. **Supply Chain Structure:** The groundnut supply chain encompasses various stages, including production, processing, transportation, and retail. Each stage involves different stakeholders such as farmers, processors, wholesalers, and retailers. Identifying the constraints at each stage is crucial for a holistic understanding [21].
2. **Market Dynamics:** The dynamics of supply and demand significantly impact groundnut marketing. Factors such as price volatility, market access, and competition affect how groundnuts are marketed. Analyzing these dynamics provides insights into the economic environment of groundnut markets [22].
3. **Institutional and Policy Environment:** Government policies, regulations, and institutional support play a pivotal role in shaping the groundnut market [23]. Understanding the regulatory landscape and institutional frameworks helps in identifying policy-related constraints.
4. **Socio-Economic Factors:** Socio-economic characteristics of the stakeholders, such as education, income, and access to credit, influence their participation and performance in the groundnut market [22]. Examining these factors is essential to address equity and inclusiveness in marketing practices.

3. Theoretical Foundations

The theoretical foundation of this review is anchored in several key theories and models from agricultural economics, supply chain management, and marketing.

1. **Transaction Cost Economics (TCE):** TCE focuses on the cost of transactions between different stakeholders in the supply chain. High transaction costs, such as those associated with information asymmetry, negotiation, and enforcement, can impede efficient groundnut marketing. This theory helps to identify and analyze these costs [21].

2. **Value Chain Analysis (VCA):** VCA examines the value addition at each stage of the supply chain [24]. By identifying where value is created and captured, VCA helps to pinpoint inefficiencies and areas for improvement in the groundnut market (Nzima et al. 2014)
3. **Market Structure-Conduct-Performance (SCP) Paradigm:** The SCP framework explores the relationship between market structure (e.g., number of sellers, level of competition), market conduct (e.g., pricing strategies, marketing practices), and market performance (e.g., efficiency, profitability) [25]. Applying this paradigm to groundnut marketing helps to understand how market structure influences behavior and outcomes.
4. **Rural Livelihoods Framework:** This framework considers the multiple dimensions of rural livelihoods, including financial, human, social, and physical capital [26,27]. Understanding how groundnut marketing fits into the broader context of rural livelihoods helps to identify constraints related to resource availability and livelihood strategies.
5. **Supply Chain Risk Management (SCRM):** SCRM involves identifying, assessing, and mitigating risks within the supply chain [28]. For groundnut marketing, risks such as weather variability, pest infestations, and market fluctuations are critical [29]. Applying SCRM principles helps to develop strategies for managing these risks [30].

These constraints may range from infrastructural challenges such as poor transportation facilities and inadequate storage infrastructure to market-related issues such as price volatility and limited market access. Social and economic factors, including lack of market information, limited bargaining power of smallholder farmers, and dependency on middlemen, also contribute to the constraints faced by groundnut growers in marketing their produce [31]. Despite its potential, the marketing of groundnuts is fraught with numerous constraints that hinder the efficiency and profitability of the sector [32]. These constraints impact not only the livelihoods of groundnut farmers but also the broader agricultural market dynamics [33,34]. Constraints associated with groundnut marketing can arise at each stage of this value chain, impacting farmers, traders, processors, and consumers alike. These constraints may stem from structural, institutional, regulatory, technological, environmental, and socio-economic factors, creating challenges that impede market efficiency, profitability, and sustainability. In many developing regions, market imperfections and inefficiencies significantly impact the livelihoods of groundnut farmers [35]. These challenges are compounded by factors such as poor market information systems, lack of bargaining power, and limited financial services [36],

which collectively reduce the competitiveness of groundnut producers in both local and international markets [37]. Addressing these constraints requires a comprehensive understanding of the marketing patterns adopted by groundnut growers and the specific barriers they encounter.

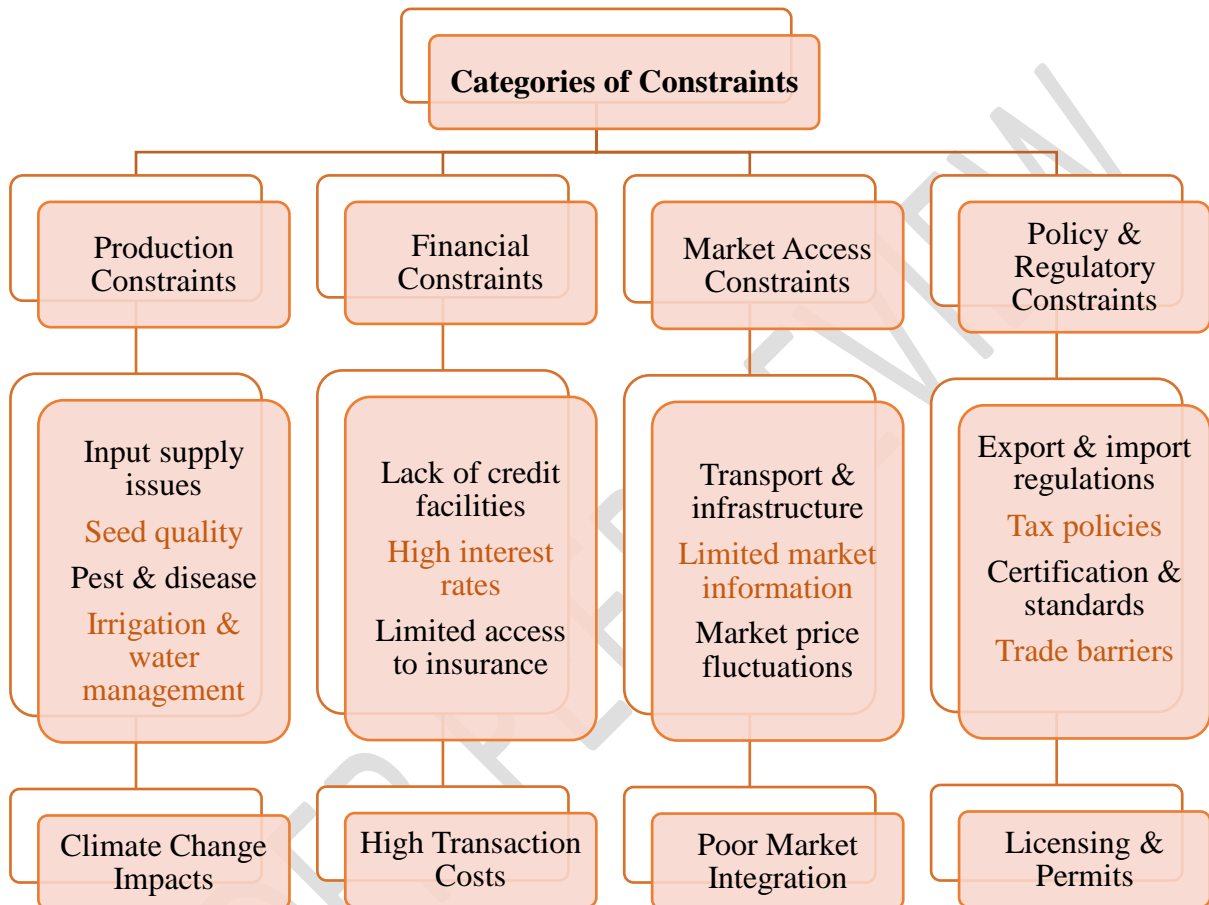


Figure 1. Categories of Constraints (Source: Authors)

4. Review of literature

Production-Level Challenges

At the production level, challenges such as pests and diseases, erratic weather patterns, poor agronomic practices, and limited access to quality inputs often impede groundnut productivity and quality, consequently affecting marketability [38,39]. Moreover, smallholder farmers, who form the backbone of groundnut production in many regions, face numerous socio-economic constraints, including limited access to credit, land tenure issues, and inadequate extension

services [40], which constrain their capacity to engage effectively in market-oriented production [41].

Post-Harvest and Infrastructure Constraints

Post-harvest losses represent a significant bottleneck in groundnut value chains, with inadequate storage facilities, inefficient handling practices, and lack of access to appropriate technologies exacerbating the problem [42,43]. One of the main issues is inadequate infrastructure, which includes poor transportation networks, a lack of storage facilities, and insufficient processing units [44]. Poor infrastructure, including roads, market facilities, and transportation networks, further complicates groundnuts' timely and cost-effective movement from production areas to consumption centers, leading to market inefficiencies and reduced profitability for market actors [45].

Additionally, the lack of proper storage facilities exacerbates post-harvest losses [46], further diminishing the quantity and quality of groundnuts available for sale (Sori et al. 2017). This not only affects the immediate income of farmers but also their ability to plan and invest in future crop cycles [47].

Market Access and Pricing Mechanisms

Groundnut growers face specific challenges that can hinder their marketing efforts. Effective marketing is crucial for ensuring that groundnut growers can maximize their returns and sustain their farming operations [48]. However, groundnut marketing systems in many regions are characterized by inefficiencies and structural challenges [25]. These include inadequate market infrastructure, lack of access to market information, and the predominance of middlemen who often exploit smallholder farmers [49]. Such issues lead to reduced bargaining power for farmers and lower profit margins [50].

Market access barriers, including limited market information, high transaction costs, and asymmetric power relations between market actors, often disadvantage small-scale farmers and traders [51,22], hindering their ability to participate in competitive markets and capture a fair share of the value chain. Farmers often do not have access to timely and accurate information about market prices, demand trends, and potential buyers [52]. This information asymmetry can result in farmers selling their produce at lower prices than they could potentially achieve [53,54,55,56,]. Additionally, the lack of market information is a critical barrier [57,58,59,60].

Pricing mechanisms characterized by volatility, opaqueness, and manipulation exacerbate the risks and uncertainties faced by groundnut producers and traders, undermining their incentives for investment and market engagement. One significant constraint is the volatility of market prices, which can be attributed to fluctuating supply and demand dynamics, as well as external factors such as weather conditions and international market trends [61].

Limited access to better markets is another significant constraint [62]. Many groundnut growers are confined to local markets, where competition is high and prices are relatively low [63]. Expanding market access to regional, national, and even international markets can help farmers achieve better prices [64,65,66]. However, this requires overcoming logistical challenges and meeting stringent quality standards.

Financial and Institutional Barriers

Access to credit is another major constraint [67], as many smallholder farmers struggle to obtain the necessary financial resources to invest in improved seeds, fertilizers, and other inputs. Without adequate funding, farmers are unable to enhance their productivity and market competitiveness [68,69]. Furthermore, transportation challenges due to poor road networks and high transportation costs limit farmers' access to larger, more lucrative markets [70].

Institutional barriers also play a critical role in hindering efficient groundnut marketing [71]. The lack of effective market information systems and weak regulatory frameworks contribute to market inefficiencies and the exploitation of farmers by middlemen [72]. Additionally, market-related challenges, such as price volatility and competition from imported groundnuts, pose significant threats to the competitiveness of locally produced groundnuts [13].

Policy and Regulatory Challenges

Policy and regulatory frameworks play a crucial role in shaping the dynamics of groundnut marketing [73], yet they often fall short of addressing the needs and priorities of smallholder farmers and other vulnerable actors in the value chain. Inadequate support for market infrastructure development, limited access to market information and extension services, and policy distortions such as trade restrictions and price controls can impede market efficiency and hinder the realization of inclusive and sustainable development objectives [74,75,76].

Strategies and interventions

Holistic and Context-Specific Interventions

In light of these challenges, there is a growing recognition of the need for holistic and context-specific interventions to enhance the competitiveness, inclusiveness, and resilience of groundnut marketing systems [71]. Addressing these marketing challenges is crucial for enhancing the economic viability of groundnut farming [77,78].

Such interventions may encompass a range of measures, including investments in research and innovation to develop resilient varieties, improve agronomic practices, and mitigate post-harvest losses. Strengthening market institutions, enhancing market transparency, and promoting inclusive value chain governance mechanisms can foster more equitable market participation and distribution of benefits among stakeholders [13]. Interventions such as establishing farmer cooperatives, improving access to market information through digital platforms, and investing in infrastructure development can play a significant role in empowering farmers [79].

Collaborative Efforts and Policy Support

Effective collaboration and partnerships among governments, private sector actors, civil society organizations, and development agencies are critical to mobilize resources, leverage expertise, and implement coordinated interventions that address the root causes of constraints in groundnut marketing [80]. Furthermore, supportive policy and regulatory frameworks are essential to create an enabling environment for groundnut marketing, characterized by transparent pricing mechanisms, improved market infrastructure, and targeted support for smallholder farmers and marginalized groups [81,82].

Additionally, policy measures aimed at stabilizing prices and providing financial support for storage and processing facilities can help mitigate risks and enhance the overall sustainability of groundnut cultivation in the region [83].

Enhancing Agricultural Outcomes: A Research Framework



Figure 2. Overcoming Challenges to Enhance Agricultural Outcomes (Source: Authors)

Fig 2 depicts a framework that offers a foundational structure for examining how different interventions may contribute to positive agricultural outcomes. Through a thorough examination of these strategies' effects on efficiency, profitability, sustainability, and farmer livelihoods, researchers can actively contribute to the formulation of effective solutions aimed at fostering a more productive and resilient agricultural sector.

5. Conclusion

Groundnut marketing is a complex and multifaceted process that involves various stakeholders and activities. While it presents numerous opportunities for smallholder farmers, it is also fraught with challenges that need to be addressed to enhance market efficiency and farmer incomes. By identifying and addressing the constraints associated with groundnut marketing, stakeholders can develop targeted interventions to improve the overall performance of the groundnut value chain. Strategies such as improving market access, implementing price stabilization mechanisms, enhancing infrastructure and storage, promoting quality standards and certification, strengthening institutional support, and leveraging digital solutions can significantly enhance the efficiency and effectiveness of groundnut marketing. These strategies can help smallholder farmers overcome the challenges they face, maximize their returns, and contribute to the sustainable development of the groundnut sector.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

- 1.
- 2.
- 3.

6. References

- 1) Li Z, Jarret RL, Cheng M, Xing A, Demski JW. Transgenic peanut (*Arachis hypogaea*). In: *Transgenic Crops I*. Berlin, Heidelberg: Springer Berlin Heidelberg; 2000. p. 209-24.
- 2) Guo BZ, Chen CY, Chu Y, Holbrook CC, Ozias-Akins P, Stalker HT. Advances in genetics and genomics for sustainable peanut production. In: *Sustainable Agriculture and New Biotechnologies*; 2011. p. 341-67.
- 3) Upadhyaya HD, Waliyar F, Nigam SN. Breeding for resistance to aflatoxin contamination in groundnut. *Aflatoxin*. 2002;1-6.
- 4) Khan MMH, Rafii MY, Ramlee SI, Jusoh M, Al-Mamun M. Bambara groundnut (*Vigna subterranea L.*): A climate-resilient crop to address food and nutritional security. *J Underutilised Crops Res*. 2024;3(1):2.
- 5) Muhammad YY. Exploring the potential of bambara groundnut, an underutilised African legume species, towards food security in Africa. *Afr J Agric Sci Technol*. 2014;2(11):201-4.
- 6) Matanmi BM, Olabode DA. Assessment of the contribution of groundnut production to the livelihood of rural women in Kwara state, Nigeria. *Equity J Sci Technol*. 2016;4(1):68-73.
- 7) Akpo E, Muricho G, Lukurugu GA, Opie H, Ojiewo CO, Varshney R. Legume seed production for sustainable seed supply and crop productivity: case of groundnut in Tanzania and Uganda. *J Crop Improv*. 2020;34(4):518-39.
- 8) Alipour HR, Doustar M, Khotbehara A. An overview marketing importance and its benefits in agricultural products. *Arab J Bus Manag Rev*. 2014;3(5):10-13.
- 9) Murthy MRK, Naikwadi PM. Sustainable agri-business development and food marketing management-opportunities & challenges in India. *Asian J Res Mark*. 2015;4(2):1-12.
- 10) Minot N, Vargas Hill R. Developing and connecting markets for poor farmers. In: *Twenty twenty (2020) focus brief on the world's poor and hungry people*. International Food Policy Research Institute (IFPRI); 2007.
- 11) Mofya-Mukuka R, Shipekesa AM. Value chain analysis of the groundnuts sector in the Eastern Province of Zambia; 2013.

- 12) Nzima WM, Dzanja J, Kamwana B. Structure, conduct and performance of groundnuts markets in Northern and Central Malawi: Case studies of Mzimba and Kasungu Districts. *Int J Bus Soc Sci.* 2014;5(6).
- 13) Nega F, Mausch K, Rao KPC, Legesse G. Scoping Study on Current Situation and Future Market Outlook of Groundnut in Ethiopia. *Socioeconomics Discussion Paper Series 38*; 2015.
- 14) Upadhyaya HD, Dwivedi SL. *Global perspectives on groundnut production, trade, and utilization: Constraints and opportunities*; 2015.
- 15) Tsusaka TW, Msere HW, Gondwe L, Madzonga O, Clarke S, Siambi M, et al. Assessing the post-harvest constraints in smallholders' groundnut production: a survey in central Malawi. *Agric Sci Res J.* 2016;6(09):213-26.
- 16) Owusu-Adjei E, Baah-Mintah R, Salifu B. Analysis of the groundnut value chain in Ghana. *World J Agric Res.* 2017;5(3):177-88.
- 17) Kannusamy K. Examining the Groundnut Marketing Problems: A Study of Erode District in Tamil Nadu. *Al-Barkaat J Finance Manag.* 2013;5(2):49-59.
- 18) Ozalp B, Oren MN. Political economy of input–output markets of groundnut: A case from the groundnut value chain of Turkey. *J Agrarian Change.* 2023:e12568.
- 19) Adinya IB. Analysis of costs-returns profitability in groundnut marketing in Bekwarra Local Government Area Cross River State, Nigeria. *J Anim Plant Sci.* 2009;19:212-16.
- 20) Ahmed MA, Idris A. Performance of Groundnut Marketing in Song Local Government Area, Adamawa State, Nigeria. *J Agric Econ Environ Soc Sci.* 2021;7(2):257-65.
- 21) Danmaigoro A, Gona A, Ishaya T, Ezekiel Naduku V. Evaluation of Groundnut Value Chain in Kebbi State, Nigeria. *Int J Integr Res.* 2023;1(9):507-18.
- 22) Mango N, Lundy M, Makate C, Jager M, Francesconi N. Determinants of market participation and marketing channels in smallholder groundnut farming: A case of Mudzi district, Zimbabwe. *Afr J Sci Technol Innov Dev.* 2018;10(3):311-21.
- 23) Sori O. Factors affecting market outlet choice of groundnut producers in Digga District of Oromia State, Ethiopia. *J Econ Sustain Dev.* 2017;8(17):61-68.
- 24) Haq ZU. *Food Value chain analysis: A review of selected studies for Pakistan and Guidelines for Further Research.* International Food Policy Research Institute; 2012. Available from: <https://pssp.ifpri.info/files/2011/12/010-Food-Value-Chain-Analysis>.
- 25) Gobie W, Amanuel TW, Tefera T. Structure, Conduct and Performance of Groundnut Markets: The Case of Fogera Woreda, South Gondar Zone of Amhara Regional State. *Int J Agric Econ.* 2019;4(2):55-69.

- 26) Boulay B, Khan R, Morrissey O. Under-utilised crops and rural livelihoods: Bambara groundnut in Tanzania. *Oxf Dev Stud.* 2021;49(1):88-103.
- 27) Yanuartati BYE. Understanding the Framework of Sustainable Rural Livelihoods in the Implementation of Market-led Rural Development. 2023;9(5):3800-07.
- 28) Fan Y, Stevenson M. A review of supply chain risk management: definition, theory, and research agenda. *Int J Phys Distrib Logist Manag.* 2018;48(3):205-30.
- 29) Loksha H, Kiresur VR, Rao PP, Bantilan MCS. Value chain management in production and marketing of groundnut in Raichur district of Karnataka. *Agric Econ Res Rev.* 2010;23:547-47.
- 30) Sen S, Choudhary V. ICT Applications for Agricultural Risk Management. In: *ICT Agric Sourceb*; 2017. p. 259-84.
- 31) Baloyi JK. An analysis of constraints facing smallholder farmers in the Agribusiness value chain: A case study of farmers in the Limpopo Province [dissertation]. Pretoria (South Africa): University of Pretoria; 2010.
- 32) Subrahmanyam P, Van der Merwe PJA, Amane M. Groundnut Production Constraints and Research Needs in Mozambique. *Int Arachis Newsl.* 1999;19:42-44.
- 33) Usman I, Taiwo AB, Haratu D, Abubakar MA. Socio-economic factors affecting groundnut production in Sabongari Local Government of Kaduna State, Nigeria. *Int J Food Agric Econ.* 2013;1(1):41-48.
- 34) Shasani S, Banerjee PK, De HK, Panda S. Constraints in adoption of groundnut cultivation technology by the farmers of Odisha. *Indian J Ext Educ.* 2020;56(2):39-44.
- 35) Barrett CB, Mutambatsere E. Agricultural markets in developing countries. In: Blume LE, Durlaug SN, editors. *The New Palgrave Dictionary of Economics.* 2nd ed. London: Palgrave Macmillan; 2008.
- 36) Shiferaw B, Obare G, Muricho G. Rural market imperfections and the role of institutions in collective action to improve markets for the poor. *Nat Resour Forum.* 2008;32(1):25-38.
- 37) Ntare BR, Waliyar F, Ramouch M, Masters E, Ndjeunga J. Market Prospects for Groundnut in West Africa. *CFC Technical Paper No. 39*; 2005.
- 38) Daudi H, Shimelis H, Laing M, Okori P, Mponda O. Groundnut production constraints, farming systems, and farmer-preferred traits in Tanzania. *J Crop Improv.* 2018;32(6):812-28.
- 39) Dillon DT, Crosby JA, Young AG. How Poverty Alleviation Efforts Manifest among Smallholder Groundnut Farmers in Eastern Zambia. *J Sustain Dev.* 2021;14(3):184.

- 40) Jambo N, Matsekete JV, Manyise T, Ruzhani F, Madzokere F. Groundnut market participation in Zimbabwe: A case of Makoni District; 2023.
- 41) Kumar M, Sharma FL, Kalash P. Constraints Perceived in Adoption of Groundnut Production Technology. *Indian J Ext Educ.* 2012;48(3&4):34-39.
- 42) Bisht A, Singh SP. Postharvest Losses and Management of Horticultural Produce: A Review. *J Sci Res Rep.* 2024;30:305-20.
- 43) Agarwal S. Post-harvest losses in agri-food supply chain: A literature review. *Int J Adv Res Sci Eng.* 2017;6(4):400-7.
- 44) Nyondo CJ, Nankhuni FJ, Me-Nsope N. Systematic analysis of groundnut production, processing and marketing in Malawi; 2018.
- 45) Chikobola MM. Profit efficiency of groundnut production: Evidence from Eastern Province of Zambia. *J Econ Sustain Dev.* 2016;7(8):38-53.
- 46) Sharma N, Khar S, Jamwal S, Gupta RP. Constraints faced by plum growers in production and marketing and suggestion made by them in district Poonch of Jammu and Kashmir. *Agric Update.* 2014;9:593-95.
- 47) Bennett AL, Edward A, Herbert A, Kingwell RS, Peak C, Rodgers D. *Changing Farming Systems—Financial Implications for Farming Businesses*; 2003.
- 48) Homann-Kee Tui S, Van Rooyen AF, Dube T, Kudita S, Chivenge P, Kondwakwenda A, et al. *Partnerships for Unlocking Potential in Groundnut Value Chains in Zimbabwe*; 2016.
- 49) Katunga A, Zegeye EW, Ortmann G. Structure and entry barriers to access groundnut markets for intermediary traders in central and northern Malawi. *Agrekon.* 2021;60(3):264-79.
- 50) Bocher TF, Simtowe FP. Profit efficiency analysis among groundnut farmers from Malawi. *J Dev Agric Econ.* 2017;9:278-88.
- 51) Singh-Peterson L, Iranacolaivalu M. Barriers to market for subsistence farmers in Fiji—A gendered perspective. *J Rural Stud.* 2018;60:11-20.
- 52) Vineetha A, Sailaja V, Gopal PS. Problems Encountered by the Groundnut Farmers and Suggestions to Overcome the Problems in Marketing of the Produce in Anantapuramu District of Andhra Pradesh. *Int J Pure Appl Biosci.* 2018;6(6):1192-96.
- 53) Courtois P, Subervie J. Farmer bargaining power and market information services. *Am J Agric Econ.* 2015;97(3):953-77.

- 54) Lokanathan S, De Silva H. Leveraging mobile 2.0 in India for agricultural market access. SSRN Electronic Journal. 2010. Available from: <https://ssrn.com/abstract=1618193>
- 55) Ullah A, Arshad M, Kächele H, Zeb A, Mahmood N, Müller K. Socio-economic analysis of farmers facing asymmetric information in inputs markets: Evidence from the rainfed zone of Pakistan. *Technol Soc.* 2020;63(C):101405.
- 56) Medda FR, Caravelli F, Caschili S, Wilson A. Information Exchange: Collaboration and Coordination Standards. In: Collaborative Approach to Trade: Enhancing Connectivity in Sea-and Land-Locked Countries; 2017. p. 197-213.
- 57) Yeshiwas Y, Tadele E. An investigation into major causes for postharvest losses of horticultural crops and their handling practice in debre markos, North-Western Ethiopia. *Adv Agric.* 2021:1-10.
- 58) Van Gogh JB, Westra EH. Reduce losses in agri production: developing building blocks for the network of excellence postharvest food losses. Wageningen UR: Food & Biobased Research; 2014. Report No.: 1488.
- 59) Kumar M. *Caesulia axillaris* Roxb leaf oil-a potential alternate of synthetic pesticides for protecting seeds of groundnut during storage; 2015.
- 60) Sambo BE, Ahmed A, Omotugba JT, Adedapo JO, Shekwolo G. The challenge of infrastructure development on preservation of perishable horticultural produce for sustained urban food nutrition in metropolitan Kaduna, Nigeria. *Int J Hortic For Res.* 2016;1(1):13-26.
- 61) Paciorek A. Supply constraints and housing market dynamics. *J Urban Econ.* 2013;77:11-26.
- 62) Mensah MSB. Access to market of a manufacturing small business sector in Ghana. *Int J Biometrics.* 2012;7:36.
- 63) Mothiba ME, Mthombeni DL, Antwi MA. Determinants of commercialization and choice of market channels among smallholder groundnut farmers in the Capricorn district, Limpopo Province, South Africa. *Afr J Food Agric Nutr Dev.* 2023;23(8):24443-58.
- 64) Nigam SN. Some strategic issues in breeding for high and stable yield in groundnut in India. *J Oilseeds Res.* 2000;17(1):1-10.
- 65) Nakhumwa C. Smallholder market access: the case of groundnut sector in Malawi [dissertation]. Greenwich (UK): University of Greenwich; 2015.

- 66) Shinde SB, Bhoite HS, Sawant GK. Constraints in adoption of recommended technologies of groundnut cultivation. *J Maharashtra Agric Univ.* 2003;28:62-66.
- 67) Yehuala S. Determinants of smallholder farmers access to formal credit: the case of Metema Woreda, North Gondar, Ethiopia [dissertation]. Haramaya (Ethiopia): Haramaya University; 2008.
- 68) Groenewald JA, Jordaan AJ. Unlocking credit markets. In: *Unlocking markets to smallholders: Lessons from South Africa*; 2012. p. 175-92.
- 69) Onumah G, Meijerink GW. Innovative agricultural financing models. ESFIM org; 2012. Report No.: 6.
- 70) McKague K, Siddiquee M. Increasing Access to Markets. In: *Making Markets More Inclusive: Lessons from CARE and the Future of Sustainability in Agricultural Value Chain Development*; 2014. p. 99-118.
- 71) Longwe-Ngwira A, Simtowe F, Siambi M. Assessing the competitiveness of groundnut production in Malawi: a policy analysis matrix approach; 2012.
- 72) Ndjeunga J, Ntare BR, Waliyar F, Ramouch M. Groundnut seed systems in West Africa: current practices, constraints and opportunities; 2006.
- 73) Mbosso C, Boulay B, Padulosi S, Meldrum G, Mohamadou Y, Berthe Niang A, et al. Fonio and bambara groundnut value chains in mali: issues, needs, and opportunities for their sustainable promotion. *Sustainability.* 2020;12(11):4766.
- 74) Nugroho AD. Agricultural market information in developing countries: A literature review. *Agric Econ.* 2021;67(11).
- 75) Chand R. Development policies and agricultural markets. *Econ Polit Wkly.* 2012:53-63.
- 76) Mendoza RU, Thelen N. Innovations to make markets more inclusive for the poor. *Dev Policy Rev.* 2008;26(4):427-58.
- 77) Tan XL, Azam-Ali S, Goh EV, Mustafa M, Chai HH, Ho WK, et al. Bambara groundnut: An underutilized leguminous crop for global food security and nutrition. *Front Nutr.* 2020;7:601496.
- 78) Idoko MD, Sabo E. Challenges in groundnut production and adoption of groundnut production technology information packages among women farmers. *Agric Biol J North Am.* 2014;5(6):252-58.
- 79) Millar D, Yeboah RWN. Enhancing rural economies: women in groundnut marketing in the Bolgatanga area. *Ghana J Dev Stud.* 2006;3(1):119-36.

- 80) Ravinder Reddy C, Tonapi VA, Nigam SN, Rao PP, Kumar AA, Reddy BVS, et al. Farmer Enabled Village Seed Banks as the Edifice of Integrated Seed System for Improved Access, Production and Supply of Groundnut Seed in India - A Case Study; 2012.
- 81) Diop N, Beghin J, Sewadeh M. Groundnut policies, global trade dynamics, and the impact of trade liberalization; 2004.
- 82) Shiferaw BA, Obare GA, Geoffrey M, Silim S. Leveraging institutions for collective action to improve markets for smallholder producers in less-favored areas. Afr J Agric Resour Econ. 2009;3(1):1-18.
- 83) Reddy AA, Bantilan MCS. Competitiveness and Efficiency in Groundnut Oil Sector of India. SSRN Electronic Journal. 2011. Available from: <https://ssrn.com/abstract=2105637>