

From Field-To-Table: Nutritional and Economic Value of Soya Bean

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ABSTRACT

The study examined the nutrition and economic benefits of soya bean production to smallholder farmers and processors in Petauke district of Zambia. Using interview guides to collected study data, the study revealed that majority of acknowledged nutritional benefit of soya-beans especially to malnutrition patients. Additionally, the study identified economic value of soya-beans through direct income from sale of raw materials, and employment opportunities in the value addition chain. Due to several challenges identified by respondents, the study brings key recommendations to the government which includes among others; provision of farming inputs on time to smallholder farmers, enhancing and simplifying irrigation schemes with minimal interest. This study introduces Institutional Support Model that bring together the government, banks, businesses, farmer groups, and NGOs in supporting soya-bean farming among smallholders.

Keywords: soya-beans, nutrition, income, smallholder-farmers

INTRODUCTION

Soya bean is a multipurpose legume grown worldwide for its high-quality protein, oil content, and wide range of industrial and household applications (Nalavwe, 2025). In sub-Saharan Africa, soya bean production has increased substantially over the last two decades, driven by demand from the poultry and aquaculture feed industries, urban consumption of processed foods, and regional trade (Mpeperekhi et al., 2000; Mabaya et al., 2010). In many agricultural communities, soya bean serve as a reliable source of income for small- to medium-scale farmers seeking financial stability (Mukwambo & Chitundu, 2019). Farmers often sell raw harvests to government agencies or private buyers, who process them into animal feed, cooking oil, or industrial products (Sitko & Jayne, 2014). This market-driven approach enables farmers to generate revenue, reinvest in their operations, and contribute to local economies. The consistent domestic and international demand for soya bean makes them a highly valuable commodity (Diouf & Sène, 2018).

Beyond commercial purposes, soya bean play a crucial role in household nutrition, particularly among small-scale farmers in Zambia. Rich in protein, vitamins, and other essential nutrients, soya bean provide a valuable food source that supports physical health and food security (Osei-Asare & Danso-Abbeam, 2021). While a portion of soya bean production is sold, many households retain some for domestic consumption, highlighting its dual role as both a cash and subsistence crop (FAO, 2017). The crop's dual role as a food-security commodity and cash crop makes it particularly valuable for smallholder farmers. Its inclusion in maize-based systems improves soil fertility through nitrogen fixation and can contribute to dietary diversification.

In Zambia, soya bean are processed into a variety of finished food products consumed widely, including soya bean porridge and soya bean chunks, which serve as protein-rich accompaniments to staple foods like nshima. These products provide affordable alternatives to meat, especially in low-income communities. However, despite national increases in production, smallholders participation in Petauke district of Eastern Province remain constrained by limited access to improved seed, inoculants, extension services, and market linkages (Sitko & Chapoto, 2015). Soya bean also significantly contribute to livestock production, particularly as a key component of poultry feed, supporting both crop and livestock ecosystems. Their versatility ensures that soya bean remain

a critical resource for improving livelihoods, enhancing food security, and promoting sustainable agriculture (Abate, et al., 2009).

Due to high protein and vitamin content, soya bean support healthier diets for both children and adults. Improved child nutrition supports school attendance and growth, while healthier adults contribute to a more productive workforce, ultimately boosting household income and national GDP (Tembo, et al., 2022). Soya bean contain approximately 35–40% protein, 15–22% oil, and 30% carbohydrates (Young, 1991; Messina, 2010). Unlike many legumes, soy protein is of high biological value, comparable to animal protein, making it a critical supplement in cereal-based diets such as maize, which dominates in Zambia.

Soy protein is rich in essential amino acids, though relatively low in methionine. When combined with cereals, it provides a balanced amino acid profile (Friedman & Brandon, 2001). Processing methods such as fermentation, boiling, and extrusion enhance digestibility and reduce anti-nutritional factors like phytates and trypsin inhibitors (Egounlety & Aworh, 2003). Consumption of soy-based complementary foods has been shown to reduce protein-energy malnutrition in children (Akindahunsi et al., 1999). Additionally, soy-based diets have potential benefits for cardiovascular health due to their cholesterol-lowering effects (Messina, 2016). Locally appropriate products include boiled whole soya bean, roasted snacks, soy-fortified maize porridge, soy milk, tofu, and textured soy protein (TSP).

Despite these benefits, smallholder farmers face challenges such as limited market access, inadequate processing infrastructure, and low awareness of soya bean-based dietary options (IITA, 2020). Addressing these constraints can enhance food security, dietary diversity, and household purchasing power, reducing dependence on government nutritional interventions in Petauke District.

THEORETICAL FRAMEWORK

This study draws on the Sustainable Livelihoods Approach and Human Capital Theory. The Sustainable Livelihoods Approach emphasizes access to assets—natural, human, financial, and social capital—as foundational to building resilient livelihoods (Abate, et al., 2009). Human Capital Theory highlights the role of education, skills, and health in enhancing productivity and economic potential (Osei-Asare & Danso-Abbeam, 2021). Together, these frameworks suggest that empowering farmers with resources, training, and market access can transform them into agents of change, promoting both agricultural success and community development.

Access to high-quality seeds, fertilizers, storage facilities, training, and market connections significantly improves the livelihoods of smallholder soya bean farmers in Petauke District. These inputs enable higher yields, better income, and improved household nutrition through increased consumption of protein-rich soya bean products (FAO, 2017). This entails that these inputs are foundational to enhancing productivity, enabling farmers to cultivate soya bean more efficiently and at higher yields. When farmers are equipped with the right tools and knowledge, they are better positioned to increase their output, earn higher incomes, and improve household nutrition through greater consumption of protein-rich soya bean products.

STUDY METHODOLOGY AND DESIGN

The study employed a qualitative case study design. Using Maximum Variation Sampling, 40 participants were selected from Petauke District, comprising 30 smallholder farmers, 5 health workers, and 5 agricultural officers. Data collection was conducted through one-on-one interviews, guided by a semi-structured interview protocol. These open-ended conversations allowed the researcher to explore topics in depth. Thematic analysis was used to identify and interpret recurring patterns and themes within the qualitative data. Ethical considerations were prioritized throughout the study to safeguard participants from potential repercussions once the findings became publicly accessible. Informed consent was obtained from all participants, and confidentiality was maintained by anonymizing responses—using pseudonyms in place of actual names during data presentation.

FINDINGS

Nutritional Benefits of Soya bean

The study revealed several nutritional values of soya bean especially in Petauke district of Eastern province. 22 out of 30 small scale farmers were aware of nutritional values of soya bean in Petauke district, while 6 were not aware and 2 were doubting. Five subthemes emerged under the “Nutritional Benefits of Soya bean”, from participant shared information.

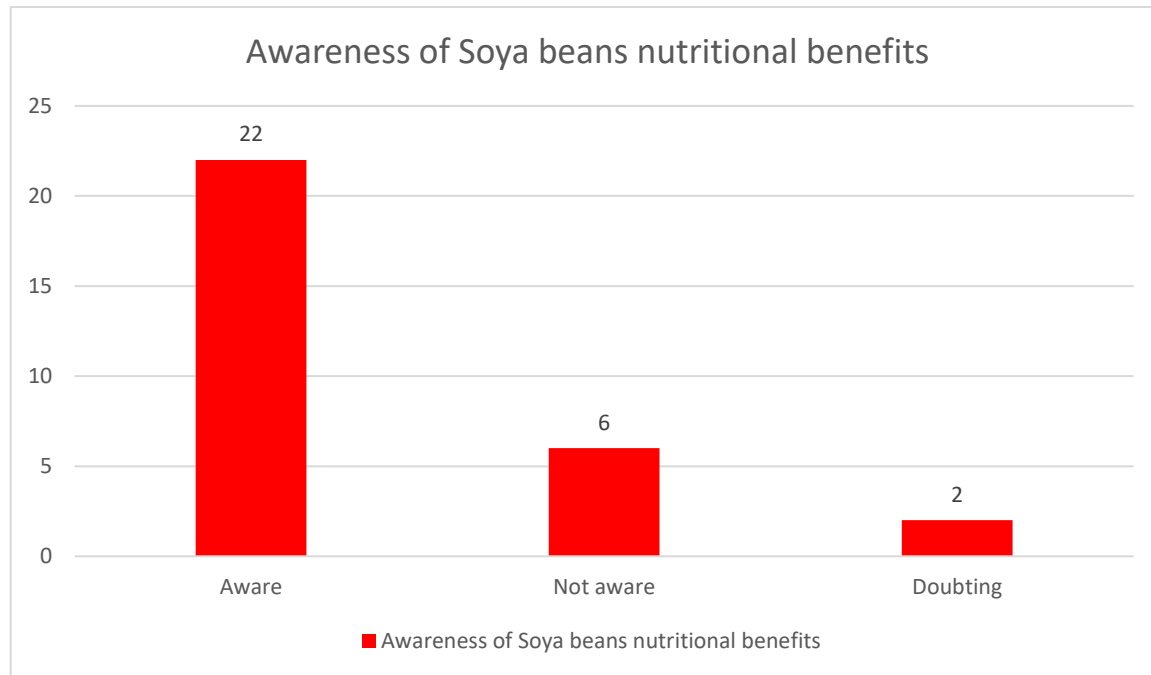


Fig 4.1. Awareness of soya bean nutritional benefits

Fig 4.1. shows that majority (22) were aware of the nutritional benefits of soya bean consumption. The minority (6) were not aware while a few (2) were not sure.

Improved Household Nutrition

Participants reported that soya bean consumption enhanced the nutritional quality of their meals, particularly by increasing protein intake and meal satisfaction. According to R1,

“Before we started growing soya bean, we mostly ate maize. Now we mix soya with nshima and vegetables, it makes the meal more filling.”

Another participant R3 shared similar view on nutritional benefits of soya bean and stated that,

"We didn't know much about the health benefits before, but now we see the difference. Since adding soya to our meals, we feel stronger and don't get tired easily, especially after working in the fields."

Further, R8 also noted that,

"Soya has changed how we cook. I now grind it into powder and use it in porridge for my children. They love the taste, and I've noticed they don't fall sick as often as they used to."

Accessibility and Affordability of Protein

The study revealed that soya bean is a cost-effective alternative to meat, making protein more accessible to low-income households. Participants from nutritional section conferred to this and observed on consolidated views below from R33, R34, R35,

"Locals learn how to make soya milk and soya sausage using shared knowledge and skills. This is cheaper than buying meat and still gives them nutrients they need in place of other expensive food."

Adding to the above, local soya bean farmer R6 said,

"Meat is expensive, but with soya bean, we can still get protein without spending too much."

Economic Benefits of Soya Bean

This section uses three thematic areas from participant's perspectives under "Economic Benefits of soya bean".

Income Generation

Participants consistently reported that soya bean farming provided a reliable source of income, enabling them to meet essential household needs. Participant R10 noted,

"After harvesting, I sold my soya bean at the market and used the money to pay school fees."

Another local farmer R13 also reported economic benefits of soya bean and explained,

"It was the first time I didn't have to borrow money for school expenses. Soya bean gave me enough to cover everything, including uniforms and books."

Further, R17 and R23 who inverted business from soya bean farming noted that,

"With the extra income from selling soya, I managed to start a small grocery shop. Now I earn something even during off-season."

Diversification of Income Sources

Farmers viewed soya bean cultivation as a strategic way to reduce dependence on maize and mitigate risks from crop failure or market fluctuations.

"When the maize failed due to drought, soya bean gave us something to fall back on."

Other local farmers, R4 and R15 suggested that they often had additional sources of income due to soya bean sales,

"Growing soya bean helped us rely less on maize and gave us a safety net when things went wrong."

Additionally, farmer R20 noted that soya bean could be used to cushion losses from other crops.

"We saw soya bean farming as a smart way to protect ourselves from crop losses and unstable markets."

Furthermore, farmer R29 suggested that farming soya bean reduced the one stream dependency on maize,

"Soya bean became our strategy to cut back on maize dependence and manage farming risks better."

Market Opportunities and Demand

Participants noted that soya bean had a ready market, with buyers often approaching them even before harvest, which increased their confidence in the crop's profitability.

"Buyers came looking for our soya bean even before we harvested. That gave us real confidence."

In addition, farmer R12 suggested that the marketability of the crop gave them confidence to produce it more,

"Knowing we could sell our soya bean before they were even out of the field made us trust the crop more."

DISCUSSION

Nutritional Benefits of Soya Bean

The findings reveal that respondents were generally aware that soya bean contain important nutrients, largely because the crop is widely recommended in health facilities for patients suffering from malnutrition (Yahaya et al., 2021). This indicates that public health campaigns and community sensitization programs have to some extent promoted awareness of the nutritional importance of soya bean. However, the study demonstrated limited knowledge of the specific nutrients present in the crop. While most participants associated soya bean with vitamins and carbohydrates, only a few correctly identified proteins as a major component. This reflects a superficial awareness of the crop's nutritional value without a deeper understanding of its composition.

The results suggest a noticeable gap in nutritional literacy among rural communities in Petauke District. Despite acknowledging soya bean as a "healthy food," many participants lacked knowledge of its high-quality protein content, essential fatty acids, and micronutrients such as iron and calcium, which are crucial in combating malnutrition and improving dietary diversity. This finding aligns with studies by Abate et al. (2019) and FAO (2017), which emphasize that while legumes like soya bean are recognized as nutritious, the public often underestimates their specific health contributions due to limited nutrition education.

Enhancing community understanding of the nutritional profile of soya bean could promote higher household consumption and contribute to improved nutritional outcomes. Nutrition awareness campaigns, coupled with agricultural extension services, would therefore play a pivotal role in bridging the knowledge gap. When households comprehend the specific health benefits of soya bean particularly its high protein and energy value, they are more likely to incorporate it into their diets regularly. This could significantly support efforts to reduce malnutrition and food insecurity in rural Zambia.

Economic Benefits of Soya Bean Production

The findings indicate that soya bean cultivation contributes significantly to the improvement of rural livelihoods in Petauke District through income generation, livelihood diversification, and enhanced household resilience. These results are consistent with studies by Abate et al. (2023), Aidoo et al. (2022), and Popp et al. (2021), which identify soya bean as a vital cash and resilience crop for smallholder farmers across sub-Saharan Africa and parts of Asia.

This study revealed soya bean farming as a dependable source of income that enable farmers to meet essential household expenses such as paying school fees, purchasing uniforms, and covering daily family needs. This observation aligns with Aidoo et al. (2022), who found that soya bean commercialization significantly improves household income and welfare of farmers. Similarly, Abate et al. (2023) highlight that the crop's favorable market prices and expanding value chain opportunities enhance income stability among smallholders.

Finding of this study are in conformity with Yahaya et al. (2021) discovery which revealed agriculture as a foundation for microenterprise development and rural entrepreneurship. Reinvesting proceeds from soya bean sales into small-scale businesses, illustrate the entrepreneurial spillover effect of agricultural income. Oyetunde-Usman et al. (2020) emphasize that income derived from legume production empowers smallholders to diversify livelihoods, thereby reducing vulnerability to poverty and economic shocks.

A second major theme that emerged from the findings relates to income diversification and risk mitigation. The study revealed that soya bean cultivation served as a strategic alternative to maize dependency, providing financial protection against crop failure, market volatility, and climatic uncertainties. This resonates with findings by Ntirenganya et al. (2020) and Nkegbe et al. (2022), who documented that integrating soya bean into mixed cropping systems enhances resilience and safeguards household welfare against economic and environmental shocks. As one participant noted, *“soya bean became our strategy to cut back on maize dependence and manage farming risks better.”* Such insights are in agreement with Chikowo et al. (2021), who argue that legume-based systems improve both income stability and food security.

Collectively, these findings demonstrate that soya bean production fosters economic empowerment, financial independence, and livelihood resilience among smallholder farmers. Beyond household-level impacts, increased production has the potential to stimulate rural market development, enhance participation in agricultural value chains, and promote community-level economic growth (Popp et al., 2021; Abate et al., 2023). Nonetheless, the sustainability of these benefits depends on access to quality inputs, reliable market structures, and continuous extension support, factors identified by Asante et al. (2024) as critical determinants of profitability in legume production systems.

Soya Bean Production and Nutrition Enhancement Model (SPNEM)

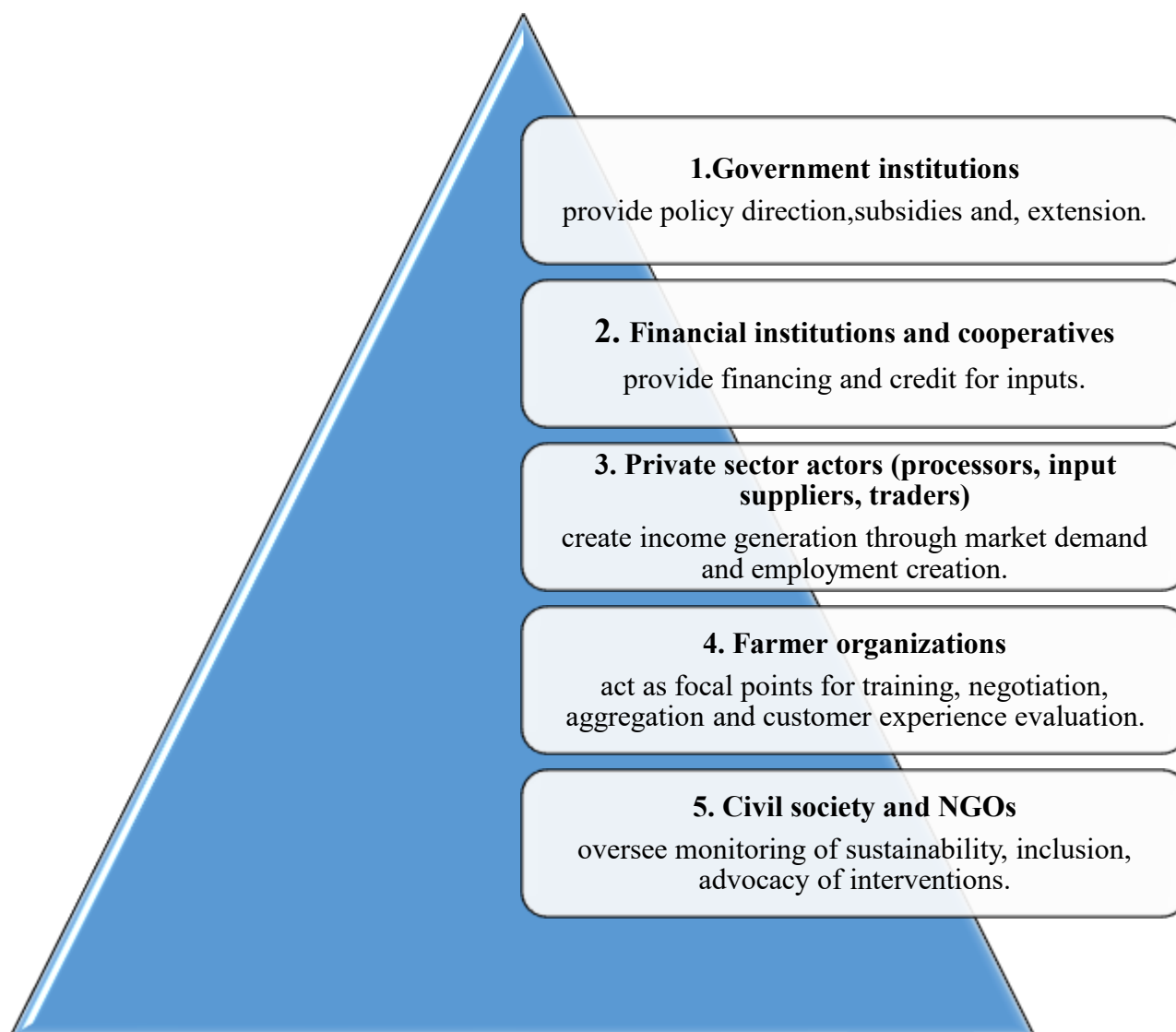


Figure 2: Soya Bean Production and Nutrition Enhancement Model (SPNEM)

Source:Own Research

Model Description

The Soya Bean Production and Nutrition Enhancement Model (SPNEM) provides a comprehensive framework for strengthening the entire soya bean value chain; from production to consumption; while addressing both nutritional and economic challenges. The model emphasizes collaboration among five main actors:

1. **Government institutions**-form the foundation by providing agricultural policies, subsidies, and extension services that create an enabling environment for sustainable soya bean production. Their support ensures policy direction, research funding, and public awareness to promote nutrition and income growth.
2. **Financial institutions and cooperatives**-supply credit, savings, and financial literacy programs that allow smallholder farmers to access inputs and technologies. Cooperatives also enable collective bargaining and risk sharing, helping farmers expand production and value addition.
3. **Private sector actors** -serve as the commercial engine, driving processing, marketing, and distribution of soya products. Their investments create jobs, stimulate demand, and ensure the availability of nutritious, affordable products in local markets.
4. **Farmer organizations**- empower producers through training, knowledge sharing, and market access. They strengthen farmers' negotiation power and help aggregate products for better prices, ensuring inclusivity and higher returns.
5. **Civil society and NGOs**- contribute by promoting awareness, inclusivity, and accountability. They champion nutrition education, advocate for gender and youth participation, and monitor social and environmental safeguards.

Findings from the study in Petauke District showed that households consuming soya-based foods experienced significant improvements in nutrition, particularly among malnourished patients, while farmers gained substantial income from soya cultivation and processing. The SPNEM thus demonstrates that coordinated action among government, financial actors, private partners, farmer groups, and civil society can transform soya bean farming into a sustainable engine for both nutrition security and economic empowerment.

RECOMMENDATIONS

The study recommend the following to the government:

1. Strengthening farmer cooperatives and expanding targeted training programmes will enhance farmers' capacity and increase the economic benefits derived from soya bean production.
2. Investing in market infrastructure and developing a more efficient value chain will promote sustained demand, improve market access, and ensure fair and stable pricing for producers.
3. Integrating soya bean cultivation into national agricultural policies and development strategies will contribute to improved household food security and increased income-generation opportunities for smallholder farmers.

REFERENCES

1. Abate, T., Tadesse, Y., & Ayele, S. (2023). Economic returns and livelihood impacts of soya bean production in East Africa. *Agricultural Systems*, 207, 103621. <https://doi.org/10.1016/j.agsy.2023.103621>
2. Abate M.T., Dessie A.B., Liyew M.Y (2019). Crop diversification analysis on red pepper dominated smallholder farming system: evidence from northwest Ethiopia. Accessed from <https://ecologicalprocesses.springeropen.com/articles/10.1186/s13717-019-0203-7>
3. Abate, T., Shiferaw, B., & Pender, J. (2009). Technology adoption and household food security in sub-Saharan Africa: The case of legumes. *Food Policy*, 34(3), 227–235. <https://doi.org/10.1016/j.foodpol.2008.10.004>

4. Aidoo, R., Mensah, J. O., & Osei-Asare, Y. (2022). Commercialization and welfare impacts of soya bean production among smallholders in northern Ghana. *Heliyon*, 8(4), e09211.
5. Akindahunsi, A. A., Salawu, S. O., & Oboh, G. (1999). Nutritional value of soya bean-fortified foods in child feeding programs. *Journal of Food Science and Technology*, 36(3), 213–219.
6. Asante, E., Boateng, E., & Ofori, R. (2024). Profitability and determinants of soya bean production in sub-Saharan Africa. *Sustainability*, 16(2), 891.
7. Chikowo, R., et al. (2021). Diversifying maize-based systems with legumes to enhance food and income security in southern Africa. *Field Crops Research*, 261, 108024.
8. Diouf, D., & Sène, M. (2018). The role of soya bean in improving nutrition and income in West Africa. *African Journal of Food, Agriculture, Nutrition and Development*, 18(2), 13456–13472.
9. Egounlety, M., & Aworh, O. C. (2003). Effect of soaking, dehulling, cooking, and fermentation on the nutritional quality of soya bean. *Journal of Food Science*, 68(9), 2801–2805.
10. FAO. (2017). Soya bean and food security in Africa. Rome: Food and Agriculture Organization of the United Nations. <http://www.fao.org/publications>
11. Friedman, M., & Brandon, D. L. (2001). Nutritional and health benefits of soy proteins. *Journal of Agricultural and Food Chemistry*, 49(3), 1069–1086.
12. IITA. (2020). Boosting soya bean production and processing for smallholder farmers in Zambia. International Institute of Tropical Agriculture. <https://www.iita.org/news>
13. Mabaya, E., et al. (2010). The soya bean value chain in Southern Africa. *Agrekon*, 49(3), 336–357.
14. Messina, M. (2016). Soy and health update: Evaluation of the clinical and epidemiologic literature. *Nutrients*, 8(12), 754.
15. Messina, M. (2010). Insights gained from 20 years of soy research. *Journal of Nutrition*, 140(12), 2289S–2295S.
16. Mpeperek, S., Javaheri, F., Davis, P., & Giller, K. E. (2000). Soya bean and sustainable agriculture: Promiscuous soya bean in Southern Africa. *Field Crops Research*, 65(2–3), 137–146.
17. Mukwambo, C., & Chitundu, M. (2019). Value chain analysis of soya bean for economic empowerment in Eastern Zambia. *Journal of Development Studies*, 55(5), 945–960. <https://doi.org/10.1080/00220388.2018.1473412>
18. Nalavwe P. (2024). Investigating the main cause of short supply of soya beans in petauke district of eastern province, Zambia. Accessed from <https://jbdjournalonline.com/index.php/files/issue/view/2957-7136>
19. Nkegbe, P., Salifu, M., & Abdulai, A. (2022). Climate-smart soya bean adoption and welfare outcomes in Ghana. *Food Policy*, 108, 102209.
20. Ntirenganya, E., et al. (2020). Legume integration for risk management and income diversification among smallholders. *World Development Perspectives*, 20, 100260.
21. Osei-Asare Oyetunde, Y. B., & Danso-Abbeam, G. (2021). Legume crops and nutrition outcomes in smallholder households in Africa. *Sustainability*, 13(12), 6652. <https://doi.org/10.3390/su13126652>
22. Popp, J., Kovács, S., & Harangi-Rákos, M. (2021). Economic and sustainability assessment of global soya bean production. *Sustainability*, 13(2), 658.
23. Sitko, N. J., & Chapoto, A. (2015). The political economy of agricultural policy reform in Zambia. *World Development*, 66, 175–189.
24. Sitko, N., & Jayne, T. (2014). Exploring the impact of commercial legume production on household food security in Zambia. *Food Security*, 6(6), 799–812. <https://doi.org/10.1007/s12571-014-0383-3>
25. Tembo, D., Chansa, C., & Mwila, T. (2022). Economic and nutritional benefits of soya bean cultivation for smallholder farmers in Eastern Zambia. *African Journal of Agricultural Research*, 17(7), 1011–1024.
26. Usman, Z., Omotesho, K. F., & Salami, M. F. (2020). Soya bean production as a pathway to poverty reduction in rural Nigeria. *Journal of Agricultural Economics and Rural Development*, 8(1), 45–56.
27. Yahaya, A., Adebayo, S. B., & Haruna, I. (2021). Agricultural income and small business development among rural farmers. *African Journal of Agricultural Economics*, 9(3), 211–225.
28. Young, V. R. (1991). Soy protein in human nutrition: An overview. *Journal of the American Dietetic Association*, 91 (7), 828–835.



Author's Bio-data

Dr. Patience Nalavwe is a Monitoring and Evaluation specialist and researcher with extensive experience in health information systems and development practice. She holds a PhD in Development Studies. She also holds a Masters Degree in Development Studies and a double major degree in Library and Information Science and Development Studies. Dr. Nalavwe has worked with the Ministry of Health, UNICEF, WHO, CDC, USAID, CHAZ, and CIDRZ, contributing to data quality audits, digital health systems, and national public health campaigns. She currently works as Medical Records Clerk for the Ministry of Health while doubling as a Monitoring and Evaluation Officer on collaborative projects between MOH and various partners like in Nutrition through auditing RMNCAHN indicators in health facilities in Petauke. She has various publications in renowned peer-reviewed journals and is constantly looking for collaboration on journal articles, research and implementation projects.



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Dr. Davy Mainde is an academician and researcher currently serving as Director of Research, Institute of Research and Development, at Africa Research University-Lusaka, where he oversees postgraduate research processes, supervision, examinations, and scholarly dissemination. He holds a PhD in Civic Education, master's degrees in Leadership, Peace and Conflict Resolution and master's degrees in Education with Civic Education. He lectures courses in education, governance, peace studies, curriculum development, and instructional design. He has supervised PhD, master's, and undergraduate research projects. He has numerous publications in peer-reviewed journals and has contributed to national curriculum development through authorship of secondary school Civic Education materials and participation in examination setting and curriculum reforms.