

Zambia's Paradox: National Food Security Amidst Household-Level Food Insecurity

Gilbert Lungu², Agnes Uwimbabazi^{1,2}, Yusuf Umer¹, Eliyas Abdi¹, Gabriel Chipando², George Bennah Mensah³, Fredrick Kayusi⁵, Abdisha Abraham Adame⁶, Petros Chavula^{1,4*}

¹Africa Centre of Excellence for Climate-Smart Agriculture and Biodiversity Conservation, Haramaya University, P.O. Box 138, Dire Dawa, Ethiopia

²School of Natural Resources Management, Copperbelt University, P.O. Box 21692, Kitwe, Zambia

³Department of Legal Research, Regulatory Advisory & Management, Africa Institute for Regulatory Affairs LBG, Accra, Ghana

⁴World Agroforestry Centre, St Eugene Office Park 39P Lake Road, P.O. Box 50977, Kabulonga, Lusaka, Zambia

⁵Department of Environmental Sciences, Pwani University, Kilifi, Kenya

⁶College of Natural and Computational Science, Department of Biology, Haramaya University, P.O. Box 138, Dire Dawa, Ethiopia

*Corresponding Author: Petros Chavula

Africa Centre of Excellence for Climate-Smart Agriculture and Biodiversity Conservation, Haramaya University, P.O. Box 138, Dire Dawa, Ethiopia

Article History

Received: 07.11.2024

Accepted: 12.12.2024

Published: 24.12.2024

Abstract: Zambia faces a paradoxical situation where the country achieves national food security through surplus agricultural production, yet significant portions of its population experience food insecurity at the household level. This disconnect arises from systemic issues such as socioeconomic disparities, inequities in food distribution, and climate vulnerabilities. Understanding and addressing this paradox is essential for ensuring that food security is both inclusive and sustainable. This study analyses the factors contributing to Zambia's national food security alongside the persistent household-level food insecurity. It seeks to identify the disconnects between policy and implementation, explore structural and social barriers, and propose actionable recommendations for bridging the gap. The study synthesizes data from academic literature, national reports, and global food security indices by adopting a review-based approach. Case studies from both rural and urban settings provide contextual insights, while comparative analysis with other countries offers a broader perspective. The analysis is guided by a framework encompassing the key dimensions of food security: availability, accessibility, utilization, and stability. The findings indicate that while robust agricultural outputs and strategic policies strengthen Zambia's national food security, household-level food insecurity persists due to poverty, limited market access, and inadequate social protection measures. Structural inefficiencies, post-harvest losses, and climatic risks further exacerbate these challenges. There is a significant need to align national food security policies with grassroots realities to ensure equitable outcomes. To address this paradox, the study recommends promoting climate-resilient farming practices, enhancing food distribution systems, and prioritizing smallholder farmers in policy frameworks. Social protection programs must be expanded to cover the most vulnerable populations, while community-based initiatives can foster local solutions to food insecurity. Bridging the gap will require coordinated efforts among government, civil society, and private sector stakeholders. This study underscores the importance of inclusive food systems to achieve equitable and sustainable food security in Zambia.

Keywords: Agricultural sustainability, Climate resilience, Crop diversification, Food security, Social protection, Targeted interventions.

1. INTRODUCTION

Zambia's agricultural sector is a cornerstone of the nation's economy and food security, contributing significantly to GDP and employing the majority of the population, particularly in rural areas (Petros *et al.*, 2024). The sector is largely driven by smallholder farmers who produce staple crops such as maize, which underpins the country's national food reserves. Over the years, government initiatives like fertilizer subsidies and strategic food reserves have bolstered

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

Citation: Gilbert Lungu, Agnes Uwimbabazi, Yusuf Umer, Eliyas Abdi, Gabriel Chipando, George Bennah Mensah, Fredrick Kayusi, Abdisha Abraham Adame, Petros Chavula (2024). Zambia's Paradox: National Food Security Amidst Household-Level Food Insecurity. *South Asian Res J Agri Fish*, 6(6), 127-136. 127

agricultural production, enabling Zambia to achieve national food self-sufficiency and, in some cases, even export surpluses (Ochieng *et al.*, 2022). Despite these successes, the benefits of national food security have not equitably translated to the household level, where food insecurity remains widespread. Many Zambian households continue to grapple with limited access to sufficient and nutritious food, high rates of malnutrition, and susceptibility to economic and environmental shocks (Mwanamwenge & Cook, 2019). This stark contrast between national food security and household-level food insecurity represents a critical paradox, underscoring the need for a deeper examination of the systemic factors contributing to this disconnect.

This study aims to address Zambia's food security paradox by pursuing three key objectives. First, it seeks to explore the factors contributing to national food security. This involves an analysis of Zambia's agricultural production systems, policy interventions, and institutional frameworks that have historically ensured national food availability (Braimoh *et al.*, 2018). Second, the study examines the root causes of household-level food insecurity, focusing on issues such as poverty, inequities in food distribution, limited access to markets, and the impacts of climate change. These factors are crucial to understanding why many households remain food insecure despite the country's agricultural abundance. Finally, the study aims to propose actionable recommendations for bridging the gap between national food security and household-level needs. These recommendations will focus on aligning policies with grassroots realities, promoting community-driven solutions, and advocating for sustainable agricultural and food distribution practices. Through addressing these objectives, the study seeks to provide a comprehensive understanding of Zambia's food security paradox and offer practical solutions to ensure that national food security translates into equitable and sustainable food access for all Zambians.

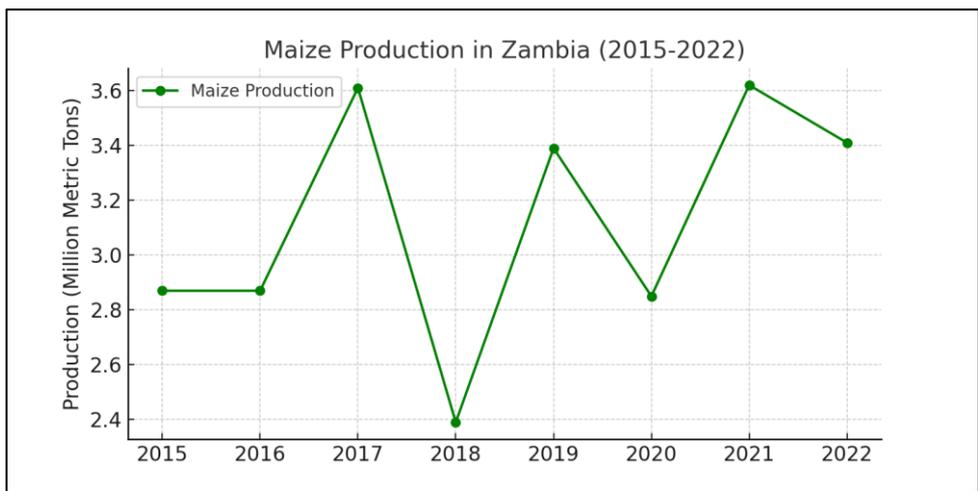
2. National Food Security in Zambia

National food security in Zambia is defined by the country's ability to produce and maintain sufficient food supplies to meet the dietary needs of its population (Burrows *et al.*, 2017). Key indicators of national food security include production statistics of staple crops, storage capacity, and export data. Annual agricultural output, particularly maize, serves as a critical metric, as it dominates Zambia's food production landscape. The availability of storage infrastructure, such as silos and warehouses, plays a pivotal role in preserving surpluses for future use, while export volumes reflect the country's ability to meet domestic demand and generate foreign exchange. Additionally, the effectiveness of government policies (Mulenga, 2013), such as strategic reserves and price stabilization measures, is a significant determinant of national food security.

Zambia's agricultural sector is anchored by the production of maize, which constitutes the bulk of national food reserves. Other staples, such as sorghum, millet, and cassava, contribute to regional and dietary diversity, particularly in areas with varying climatic conditions. Government interventions like the Fertilizer Input Support Program (FISP) have played a vital role in enhancing productivity by subsidizing agricultural inputs for smallholder farmers. Similarly, the Strategic Food Reserves (SFR) system ensures the availability of buffer stocks to stabilize food supplies and prices during shortages or emergencies. Extension services further support farmers by providing training and resources to improve farming practices and crop yields (IMF, 2007). Zambia has achieved notable success stories in national food security, including periods of surplus maize production during favourable climatic years (Masikati *et al.*, 2021). Such surpluses have allowed the country to export maize to neighbouring nations, showcasing its ability to exceed domestic needs and support regional food security. Additionally, the adoption of hybrid seeds and drought-resistant crop varieties has strengthened the resilience of the agricultural sector. Localized success in districts where sustainable farming practices have been implemented highlights the potential for addressing household-level food insecurity while contributing to overall national food sufficiency.

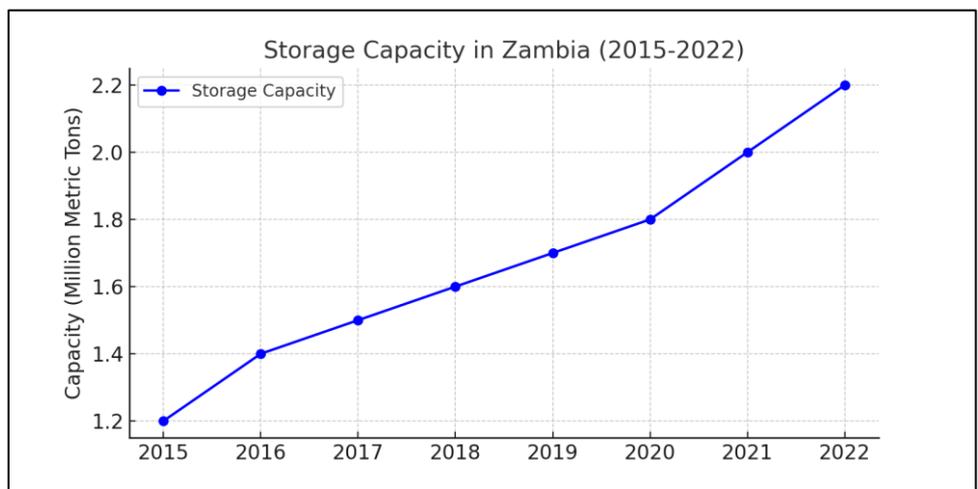
1. Maize Production in Zambia (2015-2022)

The graph below illustrates maize production in Zambia from 2015 to 2022. The data highlights fluctuations, with peaks in 2017 and 2021 corresponding to favourable climatic conditions and effective policy measures. This reflects Zambia's capacity to achieve high levels of national food production.



2. Storage Capacity in Zambia (2015-2022)

The graph below shows the steady increase in Zambia's storage capacity over the years. This trend underscores the country's efforts to enhance food security by improving infrastructure for preserving surplus food.



3. Maize Exports in Zambia (2015-2022)

The graph below presents maize export volumes from 2015 to 2022. It highlights the variability in exports, with notable increases in years of surplus production, such as 2017 and 2021. These exports contribute to regional food security and generate foreign exchange.



3. METHODOLOGY

3.1. Literature Review Process

This study employs a detailed literature review process to explore the dynamics of Zambia's paradox, where national food security coexists with household-level food insecurity. The focus is on understanding the underlying factors, policy implications, and potential interventions to address this disparity.

The literature review systematically selected and analyzed a range of academic articles, policy documents, case studies, and industry reports. Selection criteria prioritized materials relevant to food security, particularly in the Zambian context, and those published within the last decade to incorporate the most recent findings. Special attention was given to studies offering empirical data, region-specific examples, or critical analyses of agricultural practices and food distribution systems in Zambia.

To ensure comprehensive coverage, a diverse array of sources and databases was utilized. Academic platforms like Scopus, Web of Science, and JSTOR provided peer-reviewed research (Figures 1 and 2), while resources such as FAO, World Bank, and African Development Bank reports offered policy-oriented insights (Table 1). Grey literature, including government publications, conference proceedings, and NGO reports, was also reviewed to capture practical and non-academic perspectives on food security challenges and solutions in Zambia.

Table 1: Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Geographical Scope	Focus on Zambia and Sub-Saharan Africa (SSA).	Studies unrelated to Zambia or SSA.
Timeframe	Published within the last decade (2013–2023).	Studies older than 2013 unless foundational.
Content Relevance	Discusses food security, agricultural supply chains, and socio-economic impacts.	Irrelevant topics (e.g., unrelated industries or regions).
Data Type	Empirical data, case studies, or policy analysis.	Opinion pieces without evidence or unrelated discussions.
Source Type	Peer-reviewed journals, industry reports, policy documents, grey literature.	Informal blogs, non-verified sources.
Language	English publications.	Non-English publications without translations.

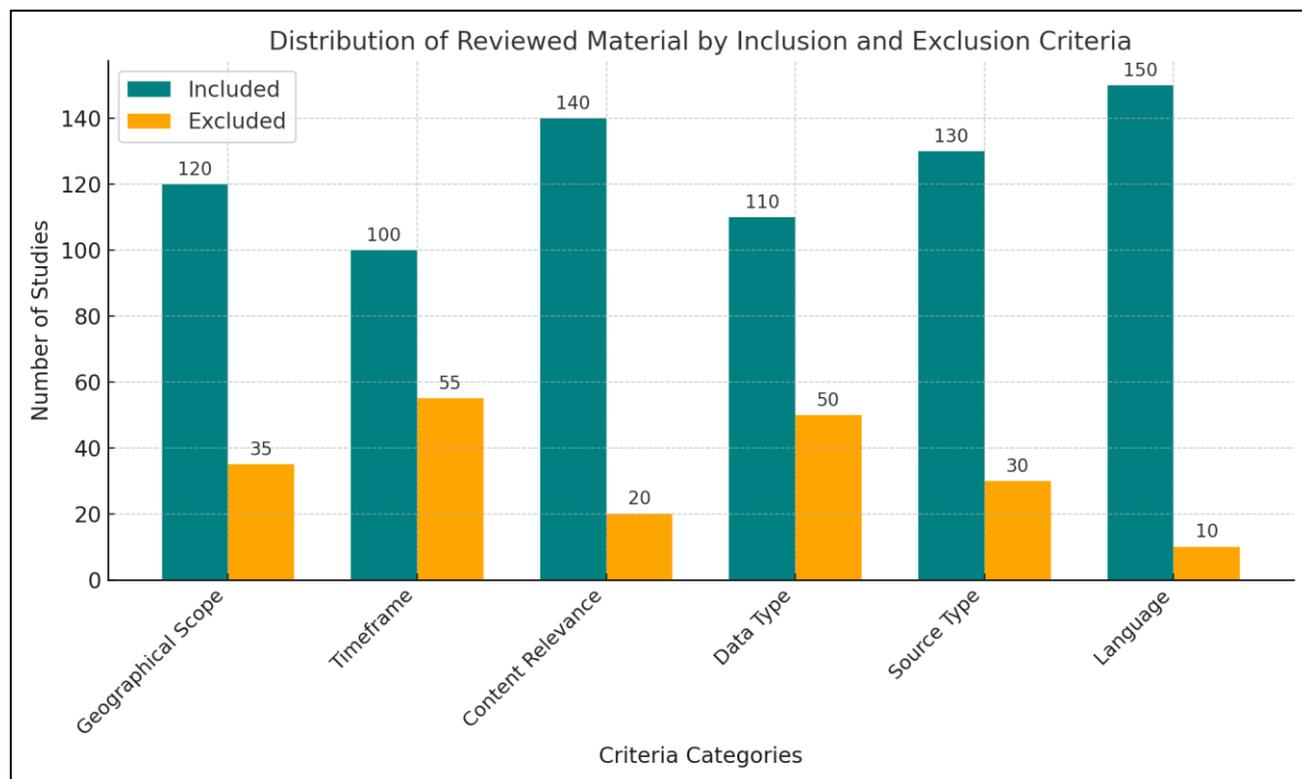


Figure 1: Distribution of Reviewed Material by Inclusion and Exclusion Criteria

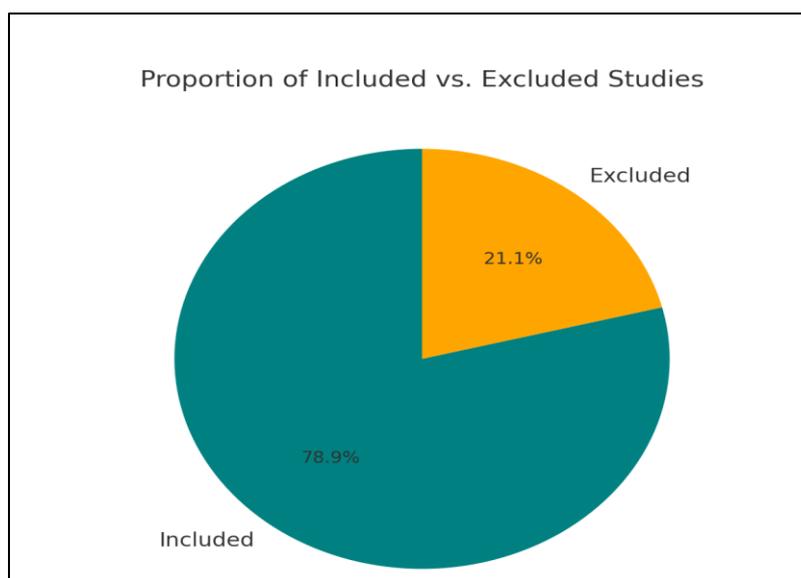


Figure 2: Proportion of Included vs. Excluded Studies

This approach ensures a balanced and nuanced understanding of the paradox by integrating academic, policy-driven, and grassroots viewpoints. The literature review is the foundation for identifying gaps in current strategies and proposing actionable recommendations for bridging the disconnect between national and household food security.

4. Household-Level Food Insecurity

4.1. Definition and Indicators

Household-level food insecurity occurs when individuals or families lack reliable access to sufficient, safe, and nutritious food to maintain an active and healthy life. Key metrics used to assess household food insecurity include the Hunger Index (Figures 3, 4 and 5), which measures the severity of hunger and undernourishment, and malnutrition rates, particularly stunting, wasting, and underweight conditions in children (Branca *et al.*, 2019). The Food Consumption Score (FCS) assesses dietary diversity, frequency, and nutritional adequacy, while the Household Food Insecurity Access Scale (HFIAS) evaluates experiences of food scarcity, such as meal skipping or portion reductions.

4.2. Underlying Factors

- a) **Socioeconomic Challenges:** Poverty is one of the primary drivers of food insecurity, as many households lack the financial resources to purchase sufficient food or invest in agriculture. Unemployment further exacerbates the issue by reducing household income (Williams *et al.*, 2015), while inequalities in access to resources, such as land, credit, and agricultural inputs, limit the capacity of families to achieve self-sufficiency (Odubote, 2019).
- b) **Inequities in Food Distribution:** Rural households, despite being food producers, often face greater food insecurity compared to their urban counterparts (Hendriks *et al.*, 2020). This is due to inadequate infrastructure, limited access to markets, and geographical imbalances in food distribution systems, which prioritize urban areas and leave remote regions underserved.
- c) **Climate Vulnerabilities:** Environmental factors significantly impact household-level food security. Droughts and floods disrupt agricultural production, deplete food stocks, and drive up food prices, while environmental degradation, such as soil erosion and deforestation, reduces agricultural productivity and resilience (*Prices, and the Role of State Interventions in Zambia*, n.d.).
- d) **Market Access and Affordability:** Limited access to functional markets in rural areas restricts opportunities for households to buy or sell food. In addition, high food prices, caused by inflation and supply chain inefficiencies, make it difficult for many families to afford nutritious meals, further exacerbating food insecurity (Libanda *et al.*, 2019).

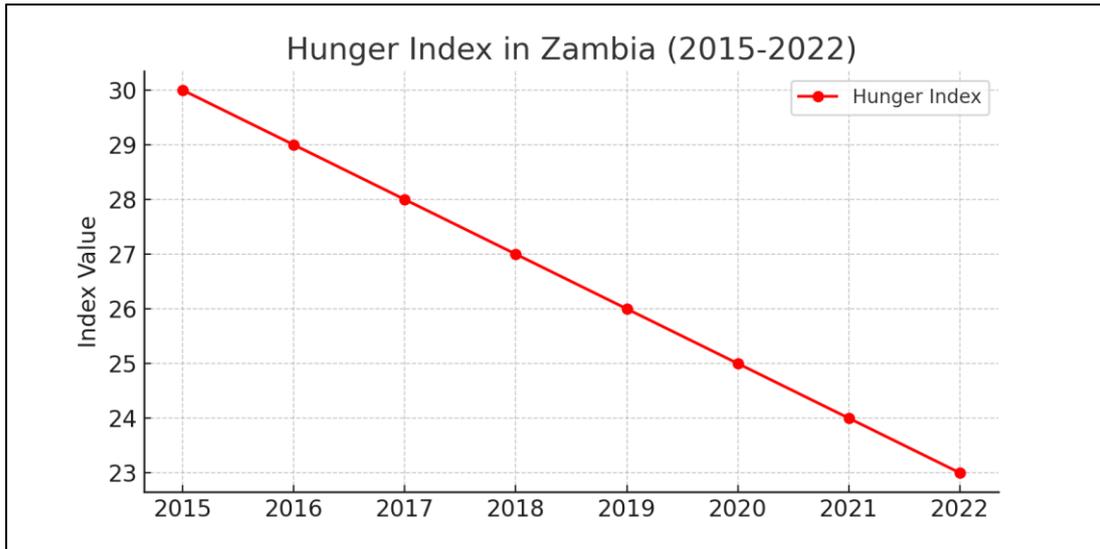


Figure 3: Hunger Index in Zambia (2015-2022)

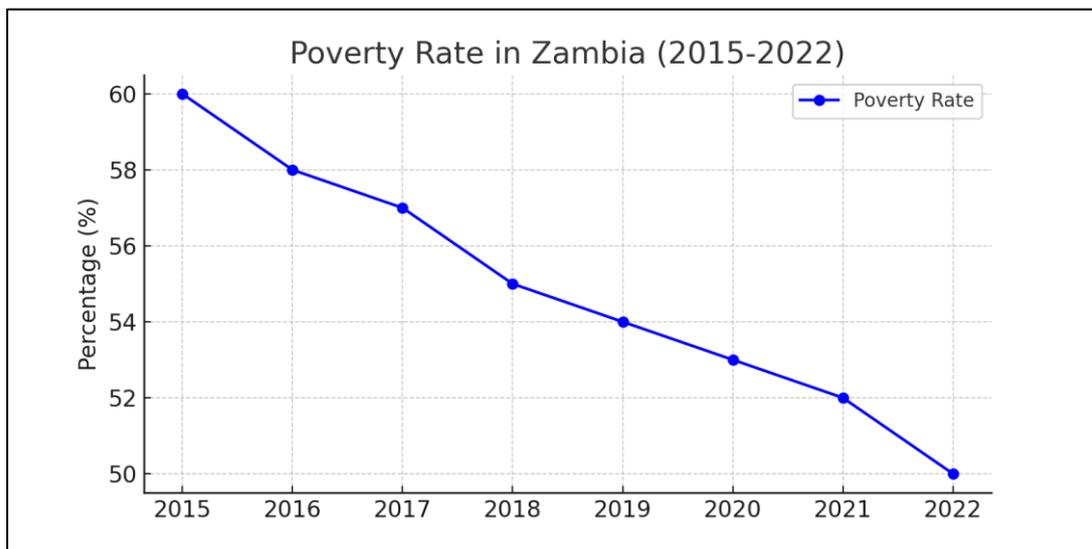


Figure 4: Poverty Rate in Zambia (2015-2022)

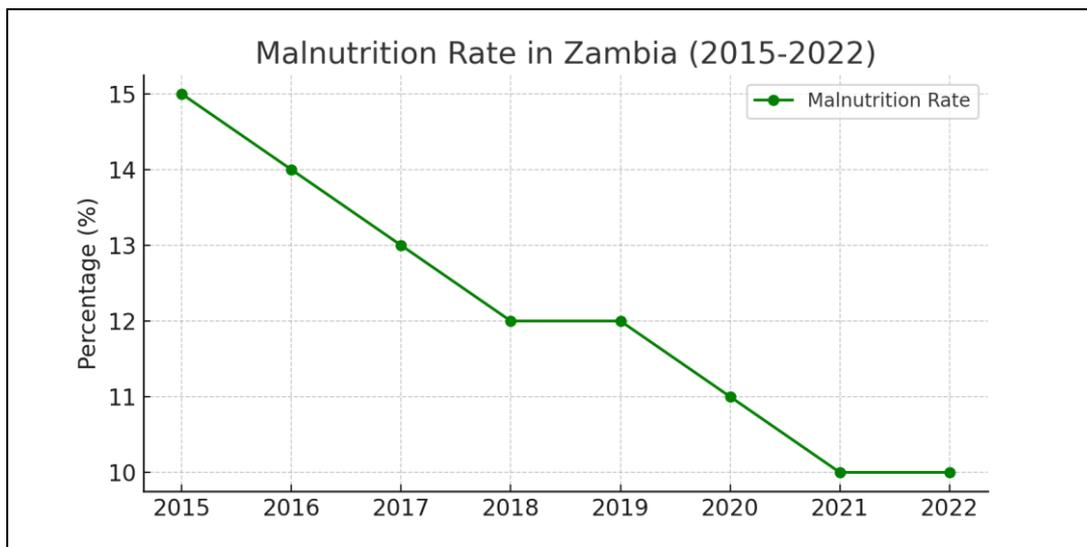


Figure 5: Malnutrition Rate in Zambia (2015-2022)

5. The Disconnect: Exploring the Paradox

5.1. Structural Challenges

- a) **Weak Policy Linkages:** National food security policies often fail to align with localized implementation, leading to gaps in addressing household-level food insecurity.
- b) **Inefficient Value Chains:** Poorly developed agricultural value chains and significant post-harvest losses reduce the availability of food for households, particularly in rural areas (Figure 6).

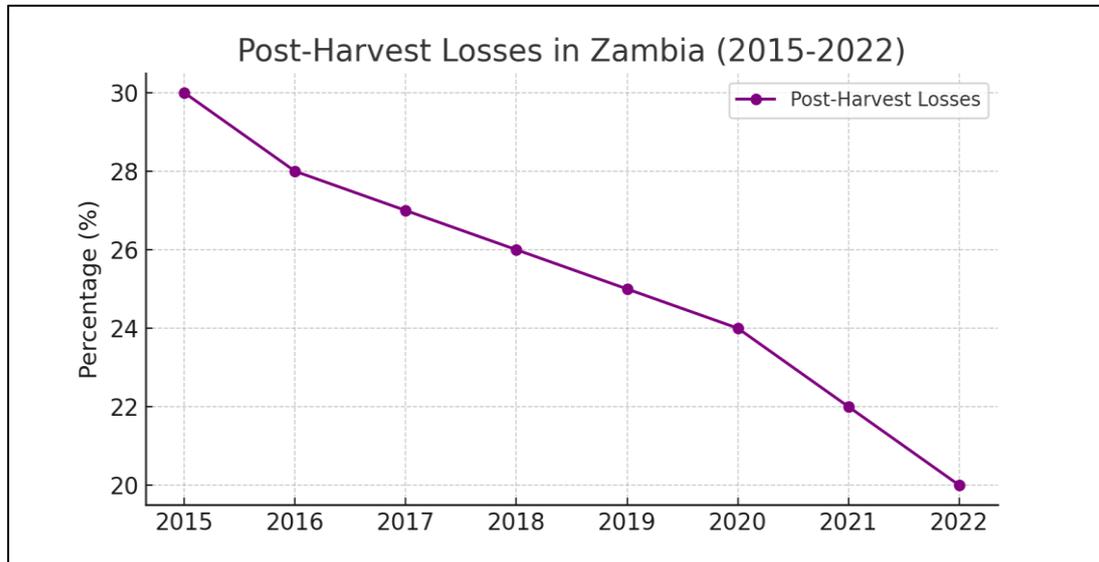


Figure 6: Post-Harvest Losses in Zambia (2015-2022)

5.2. Policy Gaps

- a) **Targeting Vulnerable Groups:** Existing policies inadequately focus on smallholder farmers and vulnerable households, who are disproportionately affected by food insecurity (Lawlor *et al.*, 2019).
- b) **Social Protection Programs:** Current programs have limitations in coverage, effectiveness, and sustainability, leaving many households without sufficient support (Figure 7).

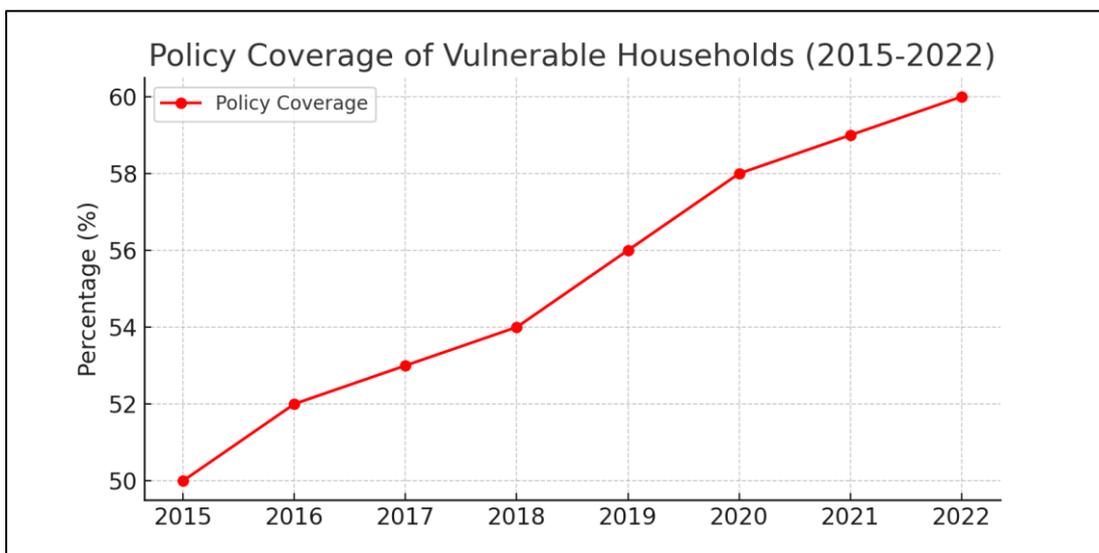


Figure 7: Policy Coverage of Vulnerable Households (2015-2022)

5.3. Cultural and Social Factors

- a) **Dietary Preferences:** Heavy reliance on maize as the staple food leads to a lack of dietary diversification, increasing nutritional deficiencies (Figure 8).
- b) **Limited Awareness:** Lack of knowledge about diverse and sustainable dietary options exacerbates food insecurity at the household level.

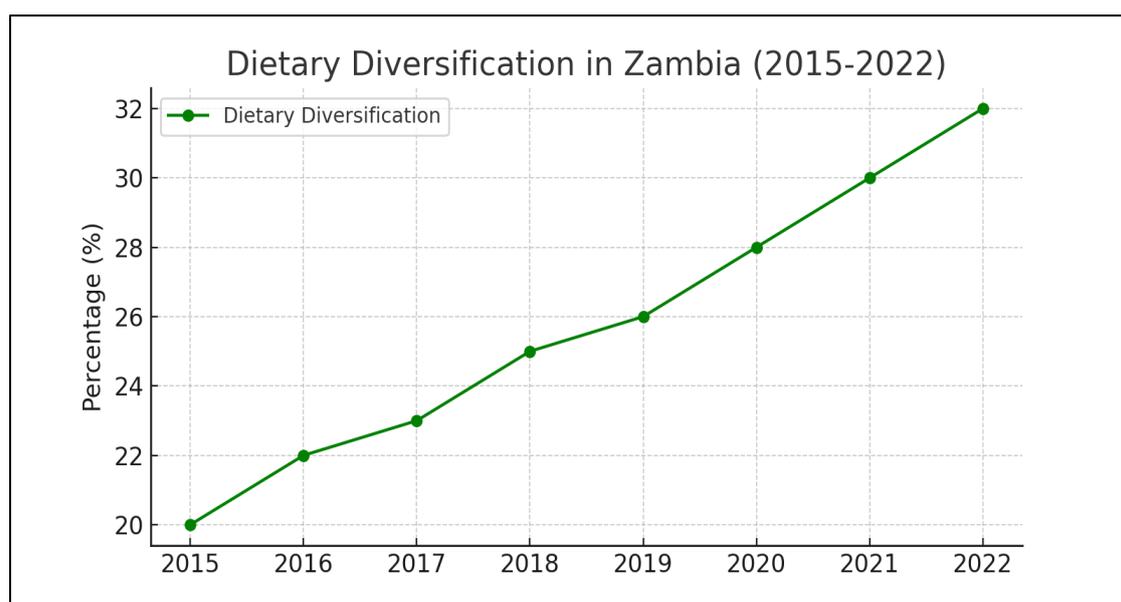


Figure 8: Dietary Diversification in Zambia (2015-2022).

6. Case Studies and Comparative Insights

6.1. Zambian Context

Political interference and the Farmers Input Support Program (FISP) have both contributed to household food insecurity in rural areas, often due to mismanagement and inefficiencies. Political influence in resource allocation tends to favour regions aligned with ruling parties, marginalizing communities with the greatest needs (Mutenje & Thierfelder, 2018). Corruption and misappropriation of funds further undermine the equitable distribution of agricultural inputs, while short-term political goals overshadow sustainable strategies for improving food security.

FISP, despite its intended benefits, often perpetuates dependency among farmers through heavy subsidies, discouraging innovation and self-reliance. The program's focus on maize production has led to monoculture practices, reducing crop diversity and increasing vulnerability to pests, diseases, and climate shocks (Chavula *et al.*, 2022). Delayed input delivery, exclusion of marginalized farmers, and inadequate extension services further limit its effectiveness. These challenges have reduced agricultural productivity, deepened inequalities, and eroded trust in government initiatives. Addressing these issues requires transparent governance, support for crop diversification, timely resource delivery, and investments in infrastructure and farmer training to build long-term resilience.

- **Household Experiences:** Despite Zambia's status as a leading maize producer, many rural households remain food insecure. For instance, households in Southern Province frequently face shortages due to localized droughts and inadequate market access, even in years of national maize surplus.
- **Inadequate Support Systems:** Social protection programs often fail to reach the most vulnerable, leaving households reliant on subsistence farming that is heavily impacted by climatic and economic shocks.

6.2. Regional and Global Comparisons

6.2.1. Lessons from Malawi

- **Dependence on Maize:** Malawi, like Zambia, heavily relies on maize as a staple crop, making its food system vulnerable to climatic shocks such as droughts and floods.
- **Challenges of Monoculture:** Over-reliance on maize cultivation has reduced soil fertility, biodiversity, and overall resilience to climate variability.
- **Diversification Efforts:** Malawi has begun promoting the adoption of drought-resistant crops such as cassava, millet, and sorghum, which offer more reliable yields under challenging environmental conditions.
- **Integrated Strategies:** To complement crop diversification, Malawi is investing in irrigation systems, conservation agriculture, and farmer training to enhance productivity and sustainability.

6.2.2. Brazil's Zero Hunger Program

- **Policy Integration:** Brazil's approach integrates social protection programs (e.g., cash transfers and school feeding programs), agricultural development, and local food procurement initiatives.
- **Local Food Procurement:** The program links smallholder farmers to institutional markets, such as schools and hospitals, ensuring stable incomes for farmers while improving local food availability.

- **Social Safety Nets:** Cash transfer programs like Bolsa Família provide financial support to vulnerable households, reducing poverty and enhancing food access.
- **Key Success Factors:** Strong political commitment, multi-sector collaboration, and robust monitoring systems have been critical to the program's success in reducing hunger and poverty.

6.2.3. India's Public Distribution System (PDS)

- **Targeted Subsidies:** The PDS delivers subsidized food grains, such as rice and wheat, to economically disadvantaged households, ensuring basic food security for millions.
- **Regional Disparities:** While effective in addressing hunger, the PDS faces challenges with inequitable access, inefficiencies, and regional differences in food availability.
- **Infrastructure Investment:** India has strengthened its supply chains by investing in warehousing, transportation, and technology to reduce waste and improve efficiency.
- **Community Engagement:** Local governance and self-help groups are increasingly involved in monitoring and distributing resources, enhancing accountability and inclusiveness.

Comparative Insights for Zambia

- **Diversification and Resilience:** Like Malawi, Zambia can mitigate its vulnerability to climatic shocks by reducing its over-dependence on maize and promoting climate-resilient crops.
- **Integrated Policies:** Drawing lessons from Brazil, Zambia could adopt a holistic approach by integrating agricultural support with social protection and local procurement.
- **Targeted Interventions:** India's PDS highlights the potential of targeted food subsidies and distribution systems to address regional disparities, though improvements in governance and infrastructure are essential.

7. Addressing the Paradox

7.1. Policy Recommendations

- **Strengthening Rural Livelihoods:** Invest in smallholder farmers by providing access to credit, inputs, and training to enhance productivity and resilience.
- **Improved Food Distribution Systems:** Develop infrastructure and logistics to ensure equitable distribution of food, prioritizing vulnerable rural and remote populations.

7.2. Improved Practices

- **Climate-Smart Agriculture:** Promote practices like conservation farming, agroforestry, and water-efficient techniques to address climate challenges and boost yields.
- **Crop Diversification:** Encourage the cultivation of nutrient-rich crops, such as legumes and tubers, to improve dietary diversity and food security.
- **Post-Harvest Management:** Implement technologies and practices to reduce losses, including better storage facilities, value-addition, and market linkages.

7.3. Community Involvement

- **Education and Capacity Building:** Conduct awareness campaigns on sustainable agricultural practices and nutrition.
- **Cooperative Formation:** Support farmer cooperatives to enhance collective bargaining, improve market access, and reduce individual vulnerabilities.
- **Empowerment Initiatives:** Involve communities in decision-making processes and equip them with tools to self-manage food security projects sustainably.

CONCLUSION

Zambia's food security paradox underscores a troubling disconnect: despite achieving national food surpluses, many households continue to experience persistent food insecurity. This paradox stems from various factors, including weak policy implementation, inefficient food distribution systems, significant post-harvest losses, and a lack of crop diversification. Socioeconomic challenges, such as poverty and limited market access, alongside climate-related vulnerabilities, further exacerbate household-level food insecurity. Addressing this issue requires a collective effort. Policymakers must strengthen targeted interventions and ensure policies are effectively implemented. Stakeholders should focus on enhancing agricultural value chains, improving post-harvest management, and supporting smallholder farmers. Communities, in turn, must adopt sustainable agricultural practices and diversify their food sources. Collaborative actions among policymakers, stakeholders, and local communities are essential to bridge the gap, ensuring that national food security translates into equitable and resilient household food sufficiency.

REFERENCES

- Braimoh, A., Mwanakasale, A., Chapoto, A., Rubaiza, R., Chisanga, B., Mubanga, N., Samboko, P., Giertz, A., & Obuya, G. (2018). *Increasing agricultural resilience through better risk management in Zambia*.
- Branca, G., Paolantonio, A., Cavatassi, R., Banda, D., Grewer, U., Kokweh-Larbi, K., & Lipper, L. (2019). Climate-Smart Agriculture Practices in Zambia: An Economic Analysis at Farm Level. *SSRN Electronic Journal, October*, 20–29. <https://doi.org/10.2139/ssrn.3305891>
- Burrows, E., Bell, M., & Rutamu, N. G. (2017). Extension and Advisory Services in Zambia: Understanding Structures, Services, Roles & Incentives for Reaching Farmer Households as a Basis for Discussing Potential for Scale. *Feed the Future, August*.
- Chavula, P., Teressa, B., Ntezimana, M. G., Umer, Y., Muleba, M., & Shentema, S. (2022). An overview of Zambia 's Agricultural Extension and Advisory System, 6(10), 209–214.
- Hendriks, S. L., Viljoen, A., Marais, D., Wenhold, F. A. M., McIntyre, A. M., Ngidi, M. S., Annandale, J. G., Kalaba, M., & Stewart, D. (2020). Considerations for the design of nutrition-sensitive production programmes in rural South Africa. *BMC Public Health, 20*(1), 1–16. <https://doi.org/10.1186/s12889-020-09445-3>
- IMF. (2007). *Zambia: Poverty Reduction Strategy Paper: Fifth National Development Plan 2006-2010. 07*. <http://www.imf.org/external/pubs/ft/scr/2007/cr07276.pdf>
- Lawlor, K., Handa, S., Davis, B., & Seidenfeld, D. (2019). Poverty-environment relationships under market heterogeneity: Cash transfers and rural livelihoods in Zambia. *Environment and Development Economics, 25*(3), 291–314. <https://doi.org/10.1017/S1355770X19000305>
- Libanda, B., Mie, Z., & Ngonga, C. (2019). *Spatial and temporal patterns of drought in Zambia. June*. <https://doi.org/10.1007/s40333-019-0053-2>
- Masikati, P., Sisito, G., Chipatela, F., Tembo, H., & Winowiecki, L. A. (2021). Agriculture extensification and associated socio-ecological trade-offs in smallholder farming systems of Zambia. *International Journal of Agricultural Sustainability, 19*(5–6), 497–508. <https://doi.org/10.1080/14735903.2021.1907108>
- Mulenga, C. (2013). The State of Food Insecurity in Lusaka, Zambia. In *AFSUN Food Security Series* (Vol. 19).
- Mutenje, M., & Thierfelder, C. (2018). *A Climate Risk Profile of Maize Value Chain Farming System in Malawi, Zambia and Zimbabwe*. CCARDESA: Gaborone, Botswana.
- Mwanamwenge, M., & Cook, S. (2019). *Beyond maize - Exploring agricultural diversification in Zambia from different perspectives*. 1–7. <https://pubs.iied.org/g04422>
- Ochieng, J., Afari-Sefa, V., Muthoni, F., Kansiime, M., Hoeschle-Zeledon, I., Bekunda, M., & Thomas, D. (2022). Adoption of sustainable agricultural technologies for vegetable production in rural Tanzania: Trade-offs, complementarities and diffusion. *International Journal of Agricultural Sustainability, 20*(4), 478–496.
- Odubote, I. (2019). The role of livestock production in addressing poverty and hunger in a changing environment: case study of Zambia. *Bulletin of Animal Health and Production in Africa, May*, 341. <https://www.cabdirect.org/globalhealth/abstract/20203272028>
- Chavula, P., Feyissa, S., Sileshi, M., & Shepande, C. (2024). Factors Influencing Climate-Smart Agriculture Practices Adoption and Crop Productivity among Smallholder Farmers in Nyimba District, Zambia. *F1000 Research, 13*, 815. <https://doi.org/10.12688/f1000research.144332.1>
- *Prices , and the Role of State Interventions in Zambian*. (n.d.). 10272–10289.
- Williams, T. O., Mul, M., Olufunke, C., Kinyangi, J., Zougmore, R., Wamukoya, G., Nyasimi, M., Mapfumo, P., Speranza, C. I., Amwata, D., Frid-Nielsen, S., Partey, S., Evan, G., Todd, R., & Bruce, C. (2015). *Unlocking Africa 's Agricultural Potentials for Transformation to Scale of Climate Smart Agriculture in the African Context*. 21. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/DakAgri2015/Climate_Smart_Agriculture_in_the_African_Context.pdf