

A Framework for Effective Transitioning of The Zambia's Food Reserve Agency from a Maize-Centric Model to a Comprehensive Strategic Grain Reserve in Zambia

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Abstract

The main aim of the research was to develop a framework for effective transitioning of the Zambia's FRA from a maize-centric model to a comprehensive SGR in Zambia. In doing so, the research aimed to propose reforms that could enable the FRA to fulfill its broader role as a comprehensive food reserve agency in Zambia. The qualitative methodology was employed under the interpretivist philosophy. Data was gathered using key informant interviews and focus group discussions and analysed using thematic analysis. The expert purposive sampling technique was employed. Through data saturation, a total of 12 individuals were interviewed whilst 15 participated in the focus group discussions. The study revealed that stakeholder engagement through PPPs and de-commercialisation, infrastructure and technology integration are possible reforms that can drive the transitioning from the maize-centric approach of the Zambia's FRA. The study concluded that the developed framework can be a guiding tool to the management at the FRA and government of Zambia towards effective and smooth transition from the maize-centric model to a comprehensive and diversified SGR in Zambia. The study recommended the management of the FRA and the government of Zambia is recommended to consider engaging in PPPs in order to realise the smooth transition from the maize-centric model. The study further recommended the government of Zambia to undertake reforms to decommercialize the FRA in order to transition from the maize-centric approach to a comprehensive SGR in Zambia.

Keywords: Maize centric; Food Reserve Agency; Procurement; Reforms, Commercialization, Public-private partnerships; Zambia

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1. Introduction

Strategic grain reserves (SGRs) stabilise grain availability, reduce food price volatility, and aid emergencies contributing to food security and nutrition security (Food and Agriculture Organization (FAO), 2017). The FAO claims well-managed SGRs reduce food shortages and import prices (WFP, 2017). However, majority of the SGRs in most African developing countries have concentrated on maize due to its staple nature (Lunduka et al., 2017). This main focus on maize for strategic grain reserve has been attributed to increased food insecurity in countries such as Zambia (Chapoto et al., 2016). Similarly, Malawi and Zimbabwe have encountered food insecurity due to focus on maize production problems, needing diversified food reserves (Holmes and Costella, 2017). Switching from maize to other grains such as sorghum, millet, and legumes is necessary for diversified SGRs towards national and regional food security (Fung et al., 2021; World Bank, 2021).

Recent research suggests that SGRs can improve national food security if they incorporate more staple crops than focusing on a single crop (Koroma et al., 2017). Zambia is among the African developing economies seeking towards transitioning from a maize-centric procurement approach to a comprehensive and diversified SGR following the enactment of the Statutory Instrument (SI) No. 73 of 2017 on Designated Agricultural Commodities and the Food and Nutrition Act No. 3 of 2020. Although the Zambia's legislative framework allows for a diversified food reserve to ensure food security, the FRA's grain procurement operations remain largely maize-centric (Fung et al., 2021). To date, FRA has not procured pulses such as mixed beans and cowpeas for SGR purposes (Chapoto et al., 2016; Chapoto, 2021; Hadunka and Teschemacher, 2024; World Bank, 2021).

It is for this reason that nutrition-related interventions have struggled to meet pulse demand in recent years, as there are never enough pulses procured from the market (World Bank, 2021). Given the need to transition from from a maize-centric procurement approach to a comprehensive and diversified SGR, there is lack of guiding frameworks or standards to direct the transitioning process due to limited empirical evidence on the subject. This research therefore seeks to develop a framework on how Zambia might transition to comprehensive food reserves towards attaining food and nutrition and food security in line with the Vision 2030 Agenda for Sustainable Development. In doing so, the research aimed to propose reforms that could enable the FRA to fulfill its broader role as a diversified food reserve agency in Zambia.

The research is outlined as follows: The second section presents the review of literature whilst the third section presents the methodology followed by presentation of findings and lastly presentation of the conclusions and recommendations.

2. Literature Review

2.1. Diversification of SGRs: Global and regional case studies

In an attempt to create comprehensive SGR models that go beyond a single staple crop, governments have focused on diversifying their SGRs (Holmes et al., 2017; Van Niekerk, 2015). Some of the notable real-world case studies drawn across the globe are presented and discussed as follows:

Diversification of SGRs in Latin America

Latin American countries have done well diversifying their food reserves to avoid overreliance on one crop (Maur and Shepherd, 2015). For instance, the Brazilian government successfully diversified its strategic grain reserve (Lesk, Rowhani and Ramankutty, 2016). Other countries that have done the same include Argentina and Mexico. For instance, the Mexico's Ministry of Agriculture implemented the PROCAMPO program to promote smallholder farmers to produce non-maize staple grains towards diversified national reserves (Santillan-Calzada, 2024).

Diversification of SGRs in Asia

Rice is the primary staple of Asia and it has historically served as the basis for many national grain reserves across the Asian region (Schlenker and Lobell, 2010). However, this has brought challenges in times of economic or climatic instability. In this regard, countries such as China, India, and Indonesia have implemented measures and policies towards multi-grain strategic food reserves (Kimani-Murage, 2015). Precisely, the India's Food Corporation was diversified to manage sizable inventories of wheat and rice (Holmes and Costella, 2017). In this trajectory, pulses and tubers are among the alternative crops that Asian nations have added to their national reserves (Morrison, 2016). One example of this diversification is the decentralised storage network in Indonesia where rice, cassava and sweet potatoes have been added to local reserves to strengthen food security (Lunduka et al., 2017).

Diversification of SGRs in Africa

The wave of diversification of SGRs has also been witnessed in some African countries (Tadesse et al., 2014). In line with this, the Economic Community of West African States (ECOWAS) has taken intentional measures to include sorghum and millet in its Regional Food Security Reserve (Holmes and Costella, 2017). However, many African nations still subsidise the production of maize and keep procurement processes that are largely centred on maize logistics (Morrison, 2016).

2.2. Challenges and opportunities for diversification of strategic grain reserves

Although it has been demonstrated that diversification of food reserve systems is key for sustainable food security and nutrition security, the process has both challenges and opportunities. For instance, multi-staple reserves may find it difficult to attain economies of scale when secondary crop procurement volumes are low, which could lead to issues with storage efficiency and waste (Chowdhury et al., 2021). Insufficient financial structures and budgetary allocations in many African states make funding diversified SGRs a major food security challenge (FAO, 2021). Many state-funded SGRs lack support due to competing budgetary goals (WFP, 2017). For instance, only 40% of Nigeria's expected grain inventories are in place due to financial issues, limiting food security in emergencies (Holmes and Costella, 2017). More so, poor storage or lack of sufficient storage can be another challenge for diversification of SGRs (Saronga et al., 2016). Other

challenges can include bureaucratic inefficiency (Koroma et al., 2017).

Besides the challenges, diversification increases regional and national resilience to market volatility and climatic shocks in a period of frequent extreme weather (Lesk, Rowhani, and Ramankutty, 2016). Increasing reserve crop diversity improves public health, nutrition, and hidden hunger (Béné, 2020). Include native staples like millet and sorghum in West Africa or cassava in Asia in government procurement strategies to promote agricultural diversity and avoid homogenising local farming practices (Çakmakçı, Salık and Çakmakçı, 2023). More so, by stabilising food prices and lowering commodity price volatility, diversified reserves prevent inflation and protect consumers (FAO, 2021; Deng et al., 2021).

Asian, West African, and Latin American successes demonstrate the benefits of diversifying key grain suppliers (World Bank, 2019). Market stability, resilience, and sustainability overcome physical, cultural, and policy limitations (World Bank, 2019). Multi-staple reserves that include nutrient-dense, climate-resilient crops can increase food security in Africa by rethinking maize paradigms (Morrison, 2016).

2.3. Critical success factors for diversification of strategic grain reserves

Literature documents some of the critical success factors for diversification of strategic grain reserves. Mashingauta (2024) found that de-commercialisation and privatization are key for diversification of SGRs. According to Adeyeye (2017), modernizing SGRs is key to achieve national food security goals through diversification. Priyadarsani, Pradhan and Jena (2023) also stated that using internet of things (IoT) technologies can improve efficiency and management of SGRs leading to diversification of the SGRs. In support, effective management and diversification of SGRs require advanced technologies and practices (Iftekhhar et al., 2021). In addition, proper training on advanced storage operations may aid in driving the diversification of SGRs (Tushar et al., 2023).

Public subsidies, private sector investments, and capacity-building are also needed to overcome these difficulties associated with diversification of SGRs (Koroma et al., 2017). Blockchain technology has gained interest for its transparent record-keeping and ability to trace grain movement in multi-crop SGRs (Çakmakçı, Salık and Çakmakçı, 2023). Furthermore, to move from a maize-centric to a diversified SGR system, a comprehensive legislative environment that permits multi-crop procurement, storage, and distribution is required (Lunduka et al., 2017). In this regard, procurement laws should be updated to incorporate assured pricing mechanisms in order to incentivise farmers to produce more staple commodities (Çakmakçı et al., 2023).

Choudhary et al. (2023) also found that stakeholder engagement through public-private partnerships (PPPs) can help in addressing the maize-centric procurement model in Nepal leading to increase commercial diversified grain production and procurement. In the same vein, Rao (2019) stated that PPPs resulted in increased participation of sorghum farmers in the grain market resulting in effective and diversified grain procurement for SGRs. Kar et al. (2021) also found that strengthening multi-stakeholder partnerships in maize, barley and wheat value chains can aid in promoting diversified procurement of grain for the SGRs.

3. Methodology

Research design and approach: The research employed the qualitative research methodology making use of primary data sources. The qualitative research was underpinned by the interpretivist philosophical framework under the ontological assumption that reality of maize-centric procurement is socially constructed such that there is no objective truth. In addition, the case-study strategy was employed to gain an in-depth understanding of the phenomenon in its natural settings as also supported by Chongo et al. (2024). The multi qualitative approach was employed where qualitative data was gathered through use of key informant interviews and focus group interviews.

Population and sampling: The population for the study was drawn from management, officials and experts from the FRA, the Ministry of Agriculture and Livestock (MAL), the Food Security Pack Programme (FSPP) and the Indaba Agricultural Policy Research Institute (IAPRI). Expert purposive sampling was employed to select the participants with expert information regarding strategic grain reserves in Zambia. Likando et al. (2023) support the employment of expert purposive sampling in qualitative research to gain in-depth information regarding the research question. The sample size for the key informant interviews was determined using the data saturation technique where a total of 12 individuals participated in the key informant interviews. Braun and Clarke (2024) also stated that a sample size of at least ten is acceptable for reaching data saturation in qualitative research. For the focus groups, three focus group interviews were undertaken where each group contained five participants in line with the recommendation by Akyıldız and Ahmed (2021) that focus group discussion should be composed of five to ten people.

Data collection and analysis: The study gathered qualitative data from primary sources. Primary data was collected using key-informant interviews and focus group discussions. The key informants included management from the FRA and analysts from the Ministry of Agriculture and Livestock, the Food Security Pack Programme and the Indaba Agricultural Policy Research Institute. The key informant interviews were undertaken over the ZOOM platform whilst the FGDs were undertaken via the WhatsApp platform guided by the procedures outlined by Colom (2022). Data was analysed using the thematic analysis approach basing on the six-step methodology provided by Braun and Clarke (2024).

Ethical considerations: The study sought ethical approval. Following ethical approval, permission was sought from

relevant authorities such as management at the FRA, Ministry of Agriculture and Livestock, the Food Security Pack Programme and the Indaba Agricultural Policy Research Institute. The participants signed informed consent forms indicating their voluntary willingness to participate in the study. Confidentiality and anonymity were observed as well as professionalism and integrity.

4. Results and Conclusions

4.1. Characteristics of participants

Based on the data saturation technique, a total of 12 individuals participated in the key informant interviews whilst 15 participated in the focus group interviews where each of the three groups contained five participants. In terms of gender distribution, majority of the participants were males. In terms of the working experience or length of service, majority of the participants had served in their respective organisations for more than 5 years. In terms of educational qualifications, majority had Master's degrees and Bachelor's degrees.

4.2. Possible reforms to enable the FRA to transition from a maize-centric model to a comprehensive food reserve system

The research aimed to find out the possible reforms that would enable the FRA to transition from a maize-centric model to a comprehensive and diversified food reserve system. From the findings of the study, several reforms were mentioned by the participants to the key informant interviews. The following statements are some of the responses of the participants.

De-commercialisation of the FRA

The participants highlighted the need to transition from the commercialisation of the FRA that is transforming the agency from being wholly a commercial profit-motive entity. One of the participants stated:

"I urge for a relook at the legislation that promoted commercialisation of the agency. The FRA should stick to its core mandate as a national strategic reserve and not expand its role to that of a commercial player in the grain market. Based on experience, FRA cannot play a role of maintaining the SGR and ensuring food security for crises while simultaneously playing the commercial role"
"The Zambia's FRA fails to meet its broader objectives including emergency response and price stabilization due to its maize-centric procurement approach" [Participant 4, Key Informant Interview]

Other participants remarked:

"Yes, the proposal to commercialise the FRA came as a way to address the financial strain of the agency which it has been placing on the Treasury. However, this move has brought other challenges resulting to the agency's taking the commercial role as its main role thereby focusing on maize, the staple food with ready market demand. This proposal has to be reversed based on similar experiences of the failed NAMBOARD which demonstrated ineffectiveness of the attempts to commercialize SGRs." [Participant 7, Key Informant Interview]

"I think engaging in privatisation or partial commercialisation of the FRA might also be a good move towards moving away from the maize-centric model which threatens food security." [Participant 29; FGD3]

The other possible reform that emerged from the findings is the de-commercialisation of the FRA. The process of moving from the commercialisation status to the de-commercialisation status of the FRA can aid in promoting transitioning of the agency from being a maize-centric SGR to a comprehensive SGR in Zambia towards attainment of food security in the country. De-commercialisation will remove the profit-motive of the FRA which has been found contributing to the maize-centric approach of the SGR. The de-commercialisation of the FRA will therefore promote procurement of all the designated commodities for the SGR. In other words, partial de-commercialisation of the FRA can also be done so that commercial operations and activities of the FRA are separated from the SGR operations and functions. The success story of de-commercialisation can be linked to the Zimbabwean case where the GMB was partially commercialized by separating commercial activities from SGR functions (Mashingauta, 2024). This reform resulted in production and procurement of traditional grains in addition to maize thereby enhancing prospects of food security (Mashingauta, 2024).

Stakeholder engagement through public-private partnerships (PPPs)

The participants also called for the FRA to engage public-private partnerships (PPPs) in order to ensure a comprehensive and diversified food reserve system in Zambia. One of the key informants stated:

"In my view, the private sector needs to be viewed as the partner of the FRA in responding to food emergencies in Zambia. There are issues related to diminished private sector participation owing to the FRA's increased role as a buyer of the staple food to maintain food availability and the associated setting of a buying price. Personally, I recommend a move toward liberalizing the maize market by allowing the procurement of grain by the private sector directly from farmers and storage and processing outside of the FRA" [Participant 9, Key Informant Interview]

Similarly, a participant from one of the FGDs also advocated for reforms that allow the FRA to collaborate with other players in the market including private sector players. The participant stated:

"In my view, there is need to promote partnership between FRA and the private sector through players such as the Zambian

Commodity Exchange (ZAMACE) or Lusaka Securities Exchange (LuSE) to make the FRA more efficient in its operations. Services offered by players such as LuSe or ZAMACE may also help in offering viable alternative market services which can help in managing market risks such as price volatility and promote diversified procurement by the FRA” [Participant 18; FGD1]

Another participant from the FGDs stated:

“I can urge the management of the FRA and the government of Zambia to create an enabling environment for the transitioning process by promoting engagement of private sector players through the PPP model” [Participant 30; FGD3]

The study revealed that promoting active stakeholder engagement through PPPs aid in the transitioning from the maize-centric model to the comprehensive food reserve system in Zambia. Partnering with the private sector can also aid in ensuring successful transitioning to a comprehensive SGR system in Zambia. Stakeholder engagement through meaningful PPPs can effectively aid in addressing the maize-centric procurement model currently being employed at the FRA. The findings are comparable to the findings by Choudhary et al. (2023) that PPPs helped in addressing the maize-centric procurement model in Nepal leading to increase commercial diversified grain production and procurement. Kar et al. (2021) also found that strengthening multi-stakeholder partnerships in maize, barley and wheat value chains can aid in promoting diversified procurement of grain for the SGRs. The study’s findings confirm the Sassi’s (2015) framework for food and nutritional security which advocates for a multi-sectoral approach to address food insecurity.

4.3. Framework for effective transitioning of the Zambia’s FRA from a maize-centric model to a comprehensive SGR in Zambia

Based on the findings, the research aimed to develop a framework for effective transitioning of the Zambia’s FRA from a maize-centric model to a comprehensive SGR in Zambia. The developed framework presented in Figure 1 is meant to guide the smooth transitioning process of the FRA from the maize centric approach to a diversified and comprehensive SGR in Zambia.

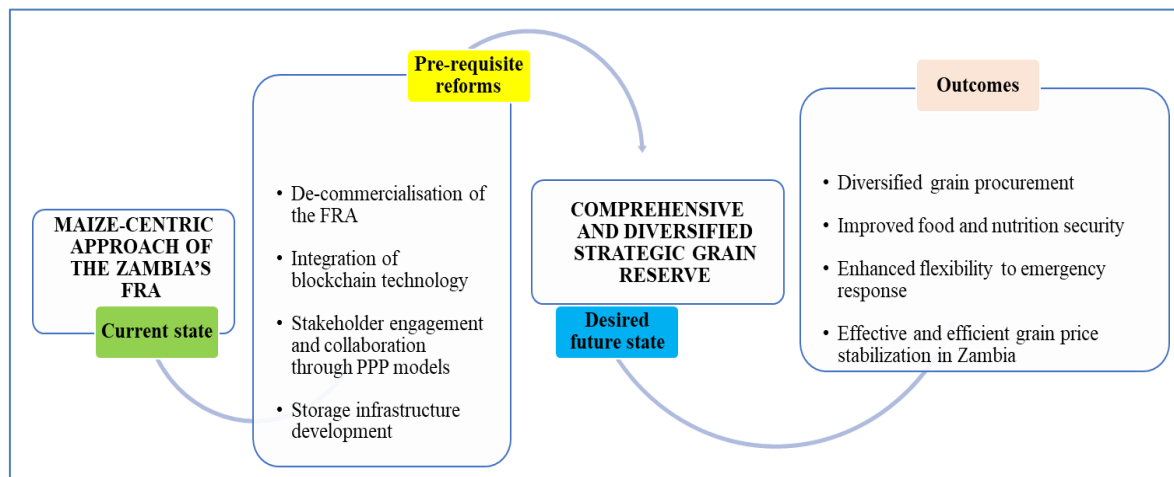


Fig. 1: Framework for effective transitioning of the Zambia’s maize-centric model

The framework presented in Figure 1 is an illustration of the framework developed for effective transitioning of the Zambia’s FRA from a maize-centric model to a comprehensive SGR in Zambia. The framework shows that transitioning from the maize-centric model requires effective collaboration and coordination with stakeholders through PPPs, integration of blockchain technologies, investments in infrastructure for the SGR and de-commercialisation of the FRA. Through these, Zambia can realise a comprehensive SGR system that will ultimately lead to diversified procurement of designated commodities, increased food and nutrition security, enhanced response to emergencies such as food crises and efficient and effective price stabilization in the grain market.

5. Conclusion and Recommendations

Conclusions

The main aim of the research was to develop a framework for effective transitioning of the Zambia’s FRA from a maize-centric model to a comprehensive SGR in Zambia. In doing so, the research aimed to propose reforms that could enable the FRA to fulfill its broader role as a comprehensive food reserve agency in Zambia. The qualitative methodology was employed under the interpretivist philosophy. Data was gathered using key informant interviews and focus group discussions and analysed using thematic analysis. The study concluded that stakeholder engagement through PPPs and de-commercialisation, infrastructure and technology integration are possible reforms that can drive the transitioning from the maize-centric approach of the Zambia’s FRA. The study also concluded that the developed framework can be a guiding tool to the management at the FRA and government of Zambia towards effective and smooth transition from the maize-

centric model to a comprehensive and diversified SGR in Zambia.

Recommendations

The study recommended the management of the Zambia's FRA to consider integrating modern technology with the operations of the FRA in order to transition to a comprehensive and diversified strategic grain reserve in Zambia. This can ultimately result in additional storage space for other designated grains thereby addressing the maize-centric approach. The management of the FRA and the government of Zambia is recommended to consider engaging in PPPs in order to realise the smooth transition from the maize-centric model. Through PPPs, the Zambia's FRA can have access to financial and technical support which can be used in enhancing the FRA's capacity towards a comprehensive strategic grain reserve. The study further recommended the government of Zambia to undertake reforms to decommmercialize the FRA in order to transition from the maize-centric approach to a comprehensive SGR in Zambia. The decommmercialization process can result in the FRA focusing on maize and other designated commodities thereby transitioning from the maize-centric model.

Limitations and recommendations for future research

The study could not be completed without any limitations. One of the limitations was that the research was the qualitative nature of the research and its reliance on primary data sources. Further studies may be undertaken making use of secondary evidence and other data collection methods. The developed model can be empirically tested in further study.

Conflict of Interest

The authors declare that they have no conflicting interests.

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Data availability statement

The data used to support the findings of this study are available from the corresponding author upon request.

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