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Food Reserves

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The Role of Strategic Food Reserves in Enhancing Food Security in Developing Countries:

The Case of Zambia

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About this working paper

This working paper is one of the products of a study conducted by DAI at the request of the European Commission as part of the advisory service ASiST managed by the unit in charge of rural development, food security and nutrition (C1) within the Directorate General for International Cooperation and Development (DEVCO).

The study has aimed at clarifying the potential role of food reserves in enhancing food and nutrition security in developing countries, and at making recommendations on how to use food reserves (in complement to other tools), taking into account the specificities on the context and the constraints of World Trade Organisation (WTO) disciplines.

The study was conducted based on i) an extensive review of the existing literature (both theoretical and empirical) and ii) 10 case studies analysing national or regional experiences in Africa, Asia and South America.

All the products of the study (including other working papers, a compilation of case study summaries, and a synthesis report) are available at: https://europa.eu/capacity4dev/hunger-foodsecurity-nutrition/discussions/how-can-food-reserves-best-enhance-food-and-nutrition-security-developing-countries.

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List of Abbreviations and Acronyms

CGP	Child Grant Programme
CSO	Central Statistical Office
DHS	Demographic and Health Survey
DFID	Department for International Development
DMMU	Disaster Management and Monitoring Unit
DRC	Democratic Republic of Congo
LCMS	Living Conditions Monitoring Survey
GHI	Global Hunger Index
GTAZ	Grain Traders Association of Zambia
FAO	Food and Agriculture Organisation
FISP	Farmer Input Support Programme
FRA	Food Reserve Agency
FSP	Food Security Pack
IAPRI	Indaba Agricultural Policy Research Institute
IFAD	International Fund for Agricultural Development
MAZ	Millers Association of Zambia
MCG	Multiple Categorical Grant
MoA	Ministry of Agriculture
MoFNP	Ministry of Finance and National Planning
MCDMCH	Ministry of Community Development, Mother and Child Health
MT	Metric Tonne
NAMBOARD	National Agricultural Marketing Board
PAC	Policy Analysis and Coordination
RALS	Rural Agricultural Livelihood Survey
SCT	unconditional Social Cash Transfer programme
SGR	Strategic Grain Reserves
UNICEF	United Nations Children's Emergency Fund
WFP	World Food Programme
WRS	Warehouse Receipt System.
ZNFU	Zambia National Farmers Union

1. Introduction

The world food price crisis of 2007, and the frequent El Nino episodes in the Southern African region have continued to cause alarm among policymakers and consumers, and Zambia is no exception. Zambian policymakers face a delicate balancing act for they need to maintain remunerative prices for farmers, while at the same time moderating retail price spikes for maize meal to protect urban consumers and the multitude of rural households who are net buyers of maize (Tembo *et al.*, 2010; and Nkonde *et al*., 2011). There is consensus among agricultural stakeholders that Zambia needs an effective plan to deal with any perceived or real grain/food shortfalls, especially those caused by recurrent weather shocks. Given that Zambia relies mainly on rain fed agriculture, it means efficiently functioning markets on their own are not sufficient to address the shortfalls. This is because with ad hoc trade policies in Zambia and other countries in the region, food prices often fluctuate widely between the bands of import and export parity (Chapoto *et al*., 2015; Chapoto and Jayne, 2009; Govereh *et al*., 2008). The size of the price band is very wide mainly due to high transport costs, storage costs, and transaction costs of trade. These problems have been an important rationale for the protectionism adopted by the Zambian government, where it tries to perform the major marketing functions in the input and output market.

Maize is the single most important crop in Zambia. It is both the most widely grown smallholder crop (with smallholder farmers accounting for 89% of total production in 2014), and the national staple food, providing about 60% of the country's caloric requirements (LCMS, 2015; Mason and Myers, 2011). Consequently, maize has featured prominently in different government's agricultural policies since Zambia's independence in 1964. The private sector has tread very cautiously in both surplus and deficit years to limit its exposure to unpredictable government behaviour, which in turn increases the costs and risks on their business enterprises.

Past experiences have shown that grain shortfalls normally create confusion in Zambia. This confusion has mainly been caused by the political sensitivity of food prices, which have resulted in the implementation of ad hoc domestic and trade policies that usually disregard fundamental domestic and regional conditions. Nevertheless, earlier work by several researchers in Zambia highlighted the sensitivities surrounding food availability and food prices. Essentially, political and economic stability are two intertwined issues. For Zambian policymakers, this means ensuring adequate supplies of maize meal at tolerable prices for urban and rural consumers at any cost, and high farm gate prices for smallholder farmers. Accordingly, the government has maintained huge strategic reserves, and passed statutory instruments to facilitate or curtail grain imports and exports, and/or subsidise the price at which it offers maize imports or local purchases to large millers.

In most shortfall years strategic grain reserves (SGRs) do not play a major role in what one would consider to be a well-planned stabilisation policy to deal with food crises[1]. The main question that this study highlights is how Zambia can take advantage of a well-managed SGR combined with other transfer programmes to ensure sustainable food security. The government has repeatedly attempted to use strategic grain reserves to help stabilise maize prices for both producers and consumers.

[1] Mwanaumo *et al.*, 2005; 2007; Nijhoff *et al*., 2002, Chapoto and Jayne, 2009; Chapoto, 2011.

Instead, the results have been less desirable, as the SGRs have been undermining market incentives for private traders to perform normal arbitrage functions that could otherwise satisfy governments' food security objectives (Dorosh *et al*, 2007; NEPAD, 2004).

Consequently, low-income consumers have been hurt by high retail prices and farmers have faced falling producer prices in surplus years. Unfortunately, this has often been blamed on the private sector, justifying the need for more government intervention. Notably, the seasonal price patterns occurring in Zambia that have led to consumers facing greater instability in prices and availability, have been shown to be a result of ad hoc trade policies and ineffective management of the grain strategic reserves held by the FRA. Given Zambia's long history of government market interventions, it would be unrealistic to assume that the government would sit on the side-lines when it comes to the management of food security in the country.

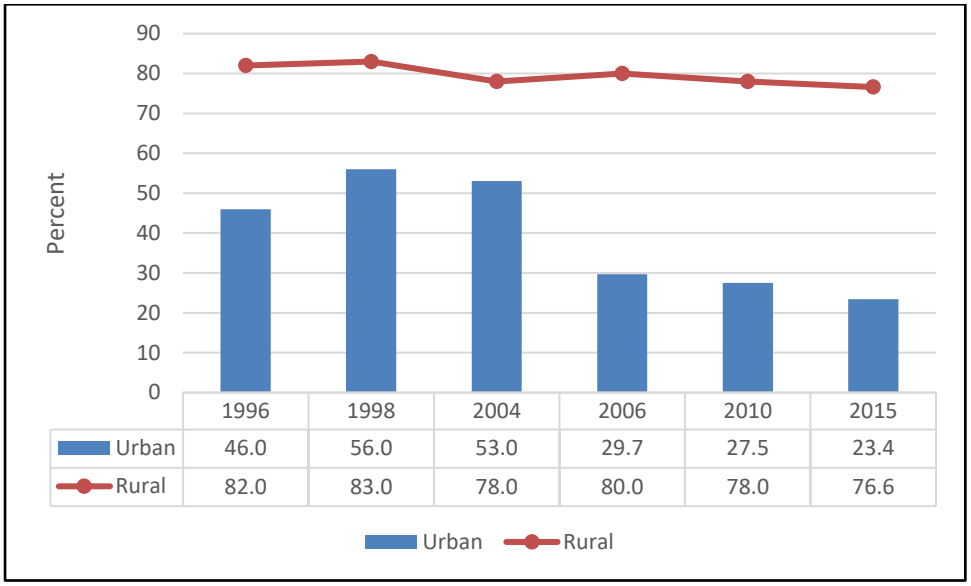
Against this background, this case study explores the effects of policies aimed at securing food reserves and public stocks on food security in Zambia, highlighting the specific pathways used and the impacts generated. The study highlights the lessons learnt and recommends the best mix of policy tools that will help Zambia improve its food security status. The Zambian story is unique in that the country has been self-sufficient in maize but continues to see localised shortfalls and price volatility, mainly due to the in-country policy responses to global food price shocks or regional weather events.

The remainder of this paper is organized into five sections: Section 2 briefly looks at Zambia's food economy and agricultural policies; Section 3 describes food security and stabilisation policies; Section 4 analyses the impact of these policies; and Section 5 looks at lessons learnt and policy options.

2. Zambian Food Economy

Zambia is a landlocked country, covering an area of 752,620 square kilometres (sq km) and bordering eight countries: Tanzania, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, Angola and the Democratic Republic of Congo, formerly Zaire. Based on the 2010 census projection, Zambia's population currently stands at 15.5 million, of which 58.2% live in the rural areas with agriculture as their mainstay for survival. The country is faced with stubbornly high levels of rural poverty (Figure 1) and has gone through six National Development Plans. While rural poverty reduction has been at the centre of these plans, sustainable solutions have remained elusive.

Figure 1: Trends in Rural and Urban Poverty Rates in Zambia

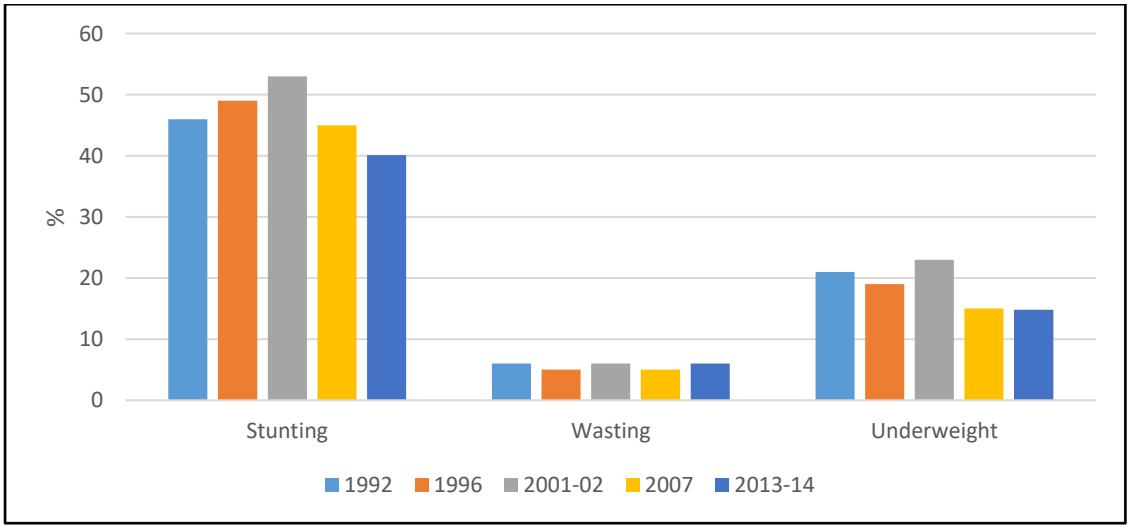


Source: CSO Living Conditions Monitoring Surveys, various years

2.1 Food Security Status

While Zambia has been experiencing remarkable maize, wheat, and soya bean production and enviable agricultural GDP growth over the last decade, the incidences of rural poverty and hunger have remained unacceptably high (Mofya and Mofu, 2015). The 2014 World Hunger Report ranked Zambia as one of the worst in Africa, and second from the bottom in the World in terms of hunger levels (FAO, IFAD and WFP, 2014). Further, according to the 2018 Global Hunger Report, the global hunger index (GHI) for Zambia is 37.6, placing it among the four highest countries with the worst rates of hunger in Africa and in the world. Using the national nutrition indicators (wasting, stunting and underweight), the 2014 Demographic and Health Survey (DHS) reported that 40% of children under 5 are stunted, with 17% being severely stunted. Children in rural areas are more likely to be stunted (42%) than children in urban areas (36%), and stunting is higher among the poorest households at 47% compared to the wealthiest at 28%. Figure 2 shows the trends in malnutrition in Zambia.

Figure 2: Trends in Stunting, Wasting and Underweight



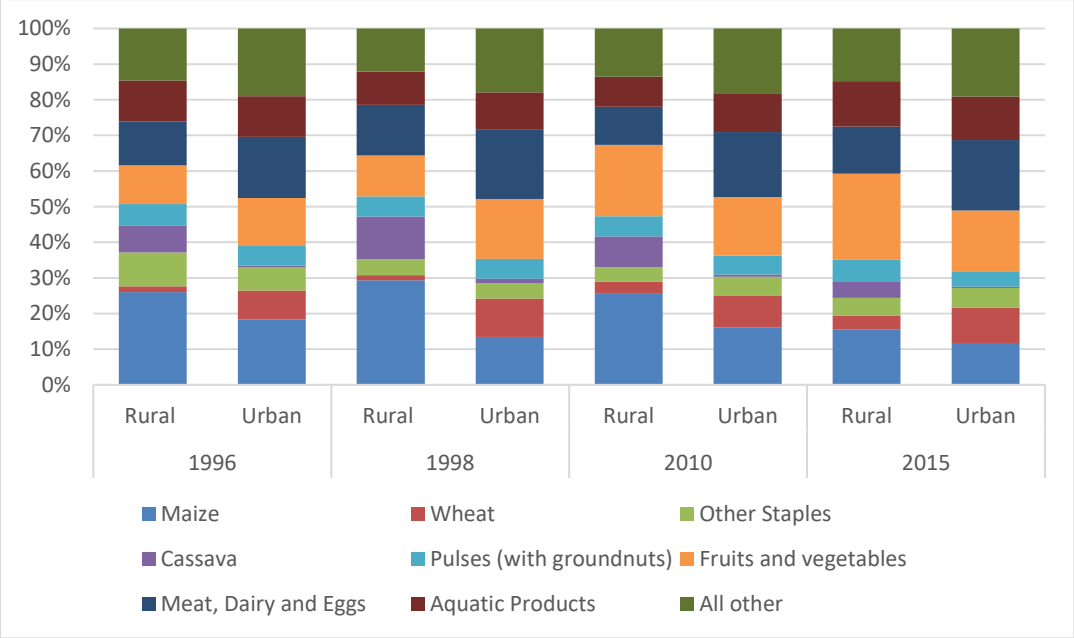
Source: Demographic Health Surveys, 2013-14

2.2 Consumption Patterns

Maize remains a dominant staple in terms of production and consumption for both urban and rural households. For rural households, cassava is the most important staple substitute for maize, while for urban households wheat is more important than rice and potatoes. Cassava consumption among urban households is very minimal. Figure 3 shows the expenditure patterns by key food crops.

In 2010, rural households were spending over half of their food budget on maize (26%), cassava (11%), aquatic products (11%), and beef (6%). On the other hand, urban households had more food expenditure diversity, with just over half of their food budget being spent on maize (18%), aquatic products (13%), vegetables (8%), poultry (8%), wheat (6%), vegetable oils and animal fats (6%), and pulses with groundnuts (6%). These results show that maize still ranks higher than all other cereals in consumption expenditures, especially among rural households. However, production and consumption of cassava in Zambia is concentrated in six out of the ten provinces.

Figure 3: Household Expenditure Patterns by Key Food Groups and Year



Source: Living Conditions Monitoring Surveys, 1996, 1998,2010 and 2015

According to the 2015 Living Conditions Monitoring Survey (LCMS), expenditure patterns by income level (wealth) show that those in the upper wealth quartile (top 25%) spend just 25% of their food budget on cereals, whilst those in the lowest quartile (bottom 25%) spend 28%. Within the cereals, households in the lower quartile spend most of their food budget on maize (17%) and cassava (5%), and are expected to be the worst affected when there are any spikes in maize prices.

Aside from the observed food expenditure composition, the general trend in consumption pattern suggest that food systems transformation is taking place in the country as the share of expenditure on cereals among the top 25% income group has been declining. Further, households have been shifting towards consumption of meat and eggs, vegetables, sugar and oils, and fish since 1996. Higher

quartile households show more diet diversity with relatively higher increases in animal proteins consumption as compared to lower quartile households. Further, expenditure on maize among the bottom 25% income group has remained largely the same, at about 30%, while it has reduced significantly for the upper quartile households from 15% in 1996 to 11% in 2010. This could be explained by the increasing rate of urbanisation, rising population and rising incomes (Chisanga and Zulu-Mbata, 2018).

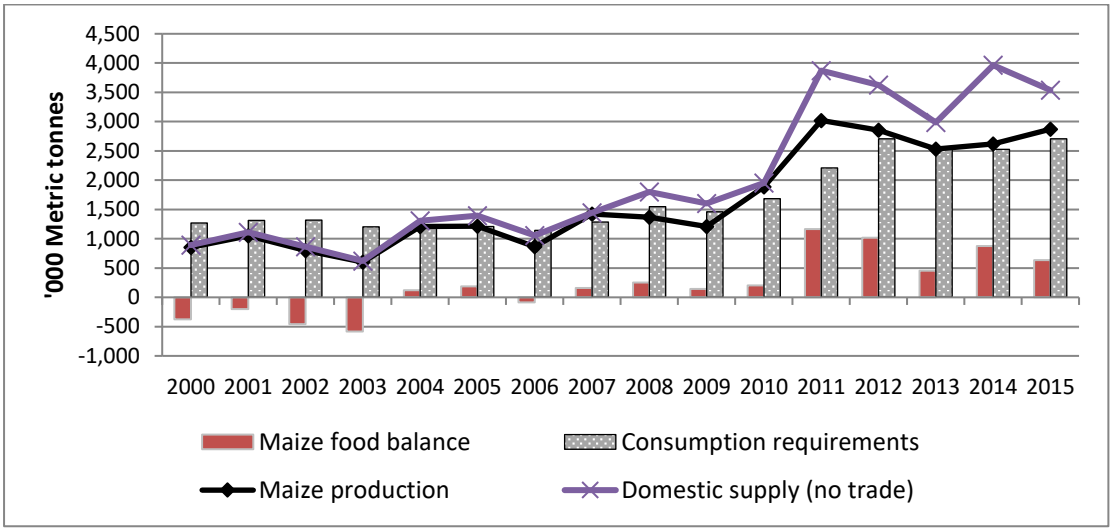
2.3 Zambia Agricultural Policy

Since Zambia's independence, a prominent goal of government agricultural policy has been to promote smallholder welfare, primarily through maize production incentives. The change from a centralised marketing system in the 1990s, to a more liberalised system did not shift this goal for the government. Instead, successive governments have attempted to increase their foothold in the grain market. However, the major difference with the pre-1990 period is that the private sector is encouraged to perform its marketing functions alongside the public sector. In practice, the private sector is often prevented from doing so due to government use of discretionary pricing and trade policy instruments, such as variable export bans and restrictions, variable import tariff rates, government import programmes and distribution of subsidised inputs, and offering maize price support (Chapoto and Jayne, 2009; Tembo *et al*, 2010; Govereh, 2008). Sections 3 and 4 discuss how Zambia manages grain reserves, implements its grain price stabilisation reserves, and impacts on various stakeholders in more detail.

2.4 Maize Production and Marketing

Zambia's agricultural sector is characterised by over 1.5 million smallholder farm households that account for a significant proportion of total agricultural output. Maize is the dominant staple food in the country, grown by more than 80% of the rural smallholder farmers in Zambia. In a good harvest year, the smallholder sector produces more than 90% of the total maize production. The country has slightly over 2,000 large scale farmers that mostly produce other crops including soybeans, sugar, and wheat (Tembo *et al*., 2010). Figure 4 shows that since 2006, Zambia has increasingly become maize self-sufficient. With good rainfall and the sustained provision of huge government subsidies on both the production and marketing side, the country has continued to produce maize surpluses.

Figure 4: Maize production, domestic supply, consumption requirements and food balance trends, 2000-2015



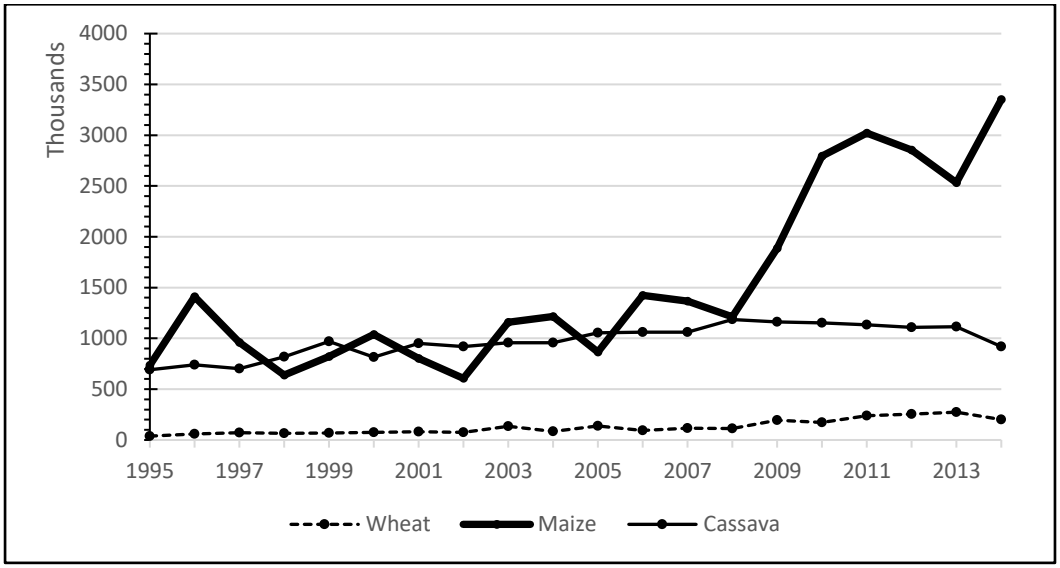
Source: Ministry of Agriculture, National Food Balance Sheets, various years

Notes: Food balance is computed as the sum of carryover stocks, production, imports less exports and consumption requirements

Zambia has produced over 2.5 million metric tonnes (MT) in each agriculture season since 2009. In 2016, total maize production is estimated to have reached 2.8 million MT, with a total market surplus of 634,681 MT. Growth in national maize production cannot be attributed to high productivity. Instead, increased maize production in the country is due to increased area under cultivation. Between 2002 and 2015, the area under maize cultivation increased from about 750,000 hectares to 1.5 million hectares. This increase is largely attributed to favourable weather and huge government subsidies (Dorosh *et al*., 2009).

While production grew tremendously, productivity during this period increased only slightly from 1.32 MT per hectare to 2.10 MT per hectare. Other challenges in maize production include the high concentration of maize markets, with 50% of the surplus production only coming from 5.5% of smallholder producers, and 70% of producers accounting for an average cultivation area of less than 2 hectares per household. Still, maize remains the dominant staple food consumed in the country.

Figure 5: Staple crops production, 1995-2014



Source FAOSTAT, various years

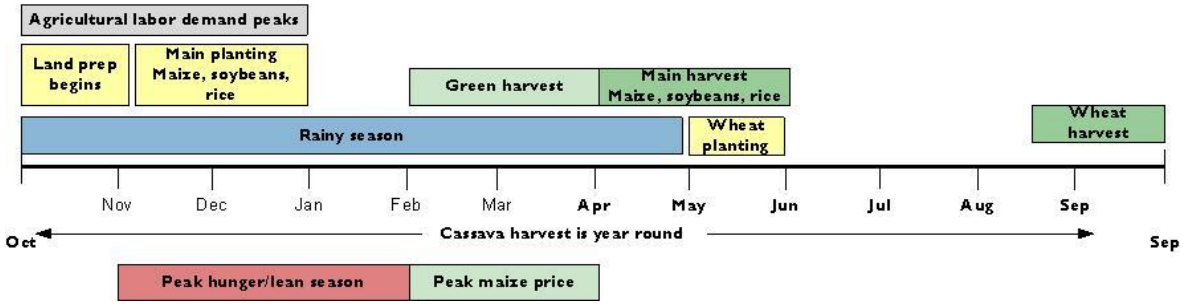
Figure 5 shows staple crop production in Zambia from 1995 to 2014. Compared to maize production, cassava production has not grown much. The area under cassava production has remained relatively unchanged since 2001. Over 75% of cassava cultivation occurs in just two provinces, Luapula and Northern. The northern and western regions in the country constitute the cassava belt, while the southern, central and eastern regions constitute the maize belt. In the cassava belt, 80% of households rely on cassava as their main staple food (Chapoto, 2014).

2.5 Maize Prices

Zambia's agriculture is mainly rain fed, so crop production is vulnerable to severe weather shocks. Past production shortfalls have always caused prices of maize to escalate, especially during the lean season from November to March.

Figure 6 summarises the annual production season in Zambia. Food relief for vulnerable households is important during any deficit. Well-functioning grain markets are then important to help alleviate huge price shocks during food shortfalls for the rest of the population not requiring food relief (Nijhoff *et al*., 2002).

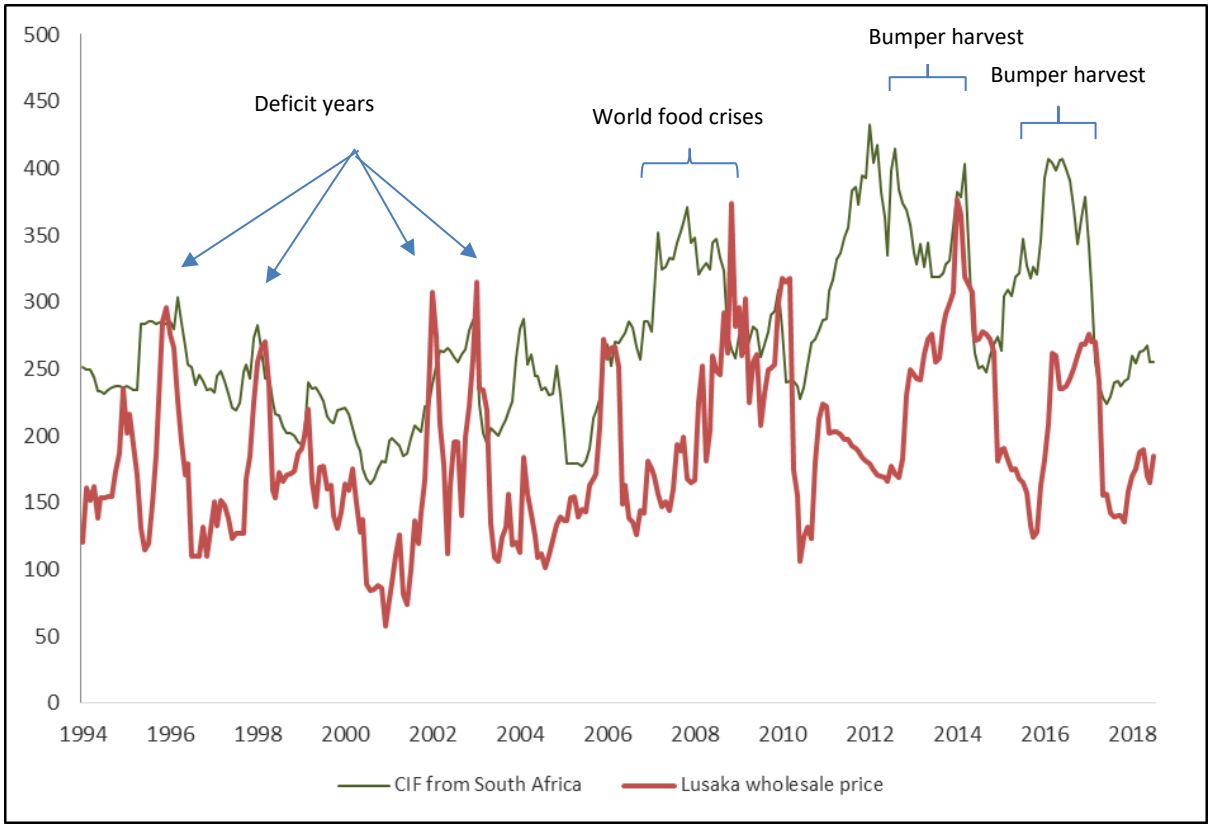
Figure 6: Seasonal calendar and critical events timeline



Source: Adopted from FEWSNET, 2015 with some Author's additions

If markets are functioning well, local prices should not exceed import parity prices as traders can make money by importing from surplus production countries. Unfortunately, this has not been the case in Zambia because in some years maize prices went above the import parity price (Figure7). During production shortfalls the combination of low domestic maize production, government hesitation, and mixed signals on maize import policy has often produced sharp hikes in prices in the lean season as shown in Figure 7 (see Mwanaumo *et al*., 2005; Chapoto and Jayne, 2009). The failure to respond timeously to impending grain shortfalls has always created hardships for poor urban and rural consumers. The answer to this hardship lies in the political economy surrounding food issues in the country, a subject that is tackled throughout this case study.

Figure 7: Trends in Import Parity and Domestic White Maize Prices, 1994 - 2014



Source: Central Statistical Office retail prices, various years and www.sagis.org.za

Price volatility and causes

In the past two decades, Zambia has experienced several episodes of food crises, in the 2001-2002, 2002-2003, 2005-2006 and 2008 -2009 marketing seasons[2]. Unlike the most recent maize price spikes in 2008-2009 that happened during the global financial and food crisis, the other price spike episodes were caused by severe drought conditions in the country that resulted in food balance shortfalls. Given that Zambia is landlocked and its agriculture is mainly rain-fed, crop production in the country is vulnerable to severe weather shocks. Production shortfalls usually cause maize prices to escalate, especially during the hungry/lean season in November through February. Nonetheless, the country has not learnt how to plan and quickly respond to impending food shortfalls from past experiences.

[2] Zambia's marketing season runs from 1st May to 30th April.

The absence of a standard operational strategy on how to deal with impending maize grain shortages has usually led to the maize price rising above import parity.

The government's strategy has always been to:

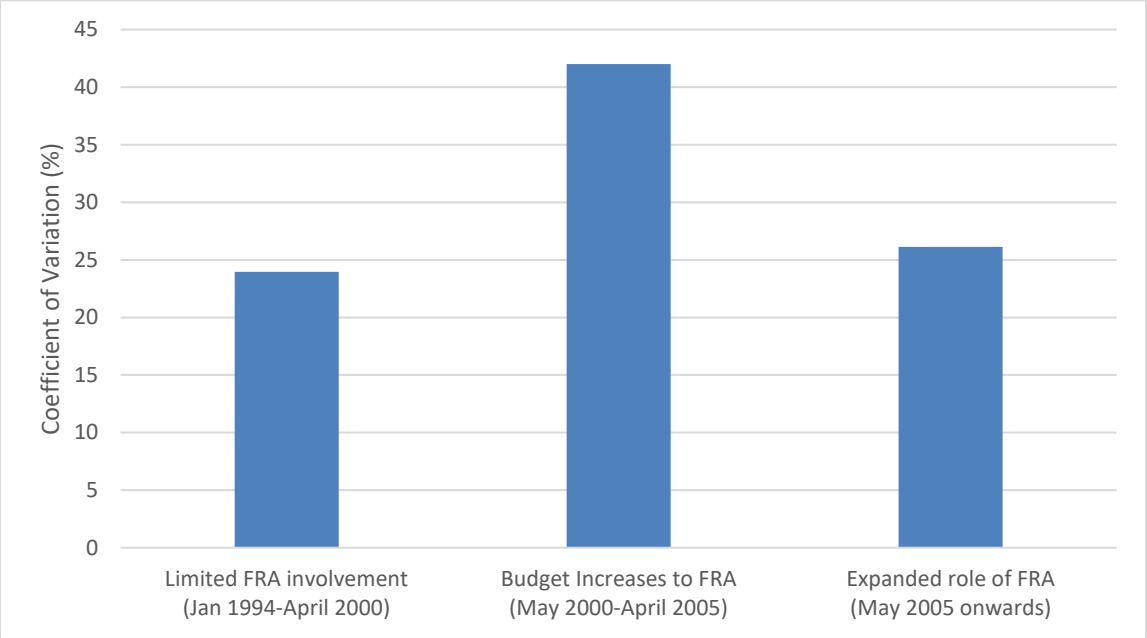
1. Impose maize export bans/restrictions without looking at implications on regional trade.
2. Reach agreements with private traders on the quantity of maize to be imported and how much each of the different stakeholders should import.
3. Request import duty waivers from the Ministry of Finance and National Planning (MoFNP).
4. Provide subsidised maize grain to millers for onward transmission to consumers.

Ad hoc policy interventions have led to high levels of mistrust between government and the private sector. Also, opposing self-interests among the key interest groups and vested interest amongst some individuals in both the public and private sector has often led to inertia in dealing with supply shortfalls.

Figure 8 compares the coefficient of variation for three phases. Phase 1 is defined as the period between January 1994 and April 2000. Zambia's maize marketing and trade policy had started undergoing partial reform during this period. Under pressure from a growing budget deficit and international donors, the Zambian government took steps to liberalise maize input and product markets, and discontinued consumer subsidies on maize meal. However, continuing with the desire of market stabilisation, the Zambian government established in 1996 the Food Reserve Agency (FRA), officially charged with holding strategic grain reserves. Unlike its predecessor, the National Agricultural Marketing Board (NAMBOARD), which was the sole buyer and seller of grain in Zambia, the FRA was originally conceived to hold buffer stocks to dampen price variability and, when necessary, provide liquidity in the maize market during the initial years of market liberalisation while the private sector was establishing itself. The government has remained involved in arranging maize imports, subsidising the price at which it offers maize imports to large millers (Nijhoff et al., 2003). Up until the 2000/2001 marketing season, FRA involvement in buying and selling grain was very limited, and all purchases and sales were done via a tender process. Of the three phases, phase 1 has the lowest unconditional coefficient of variation, meaning less price volatility compared to the other two phases.

Phase 2 (May 2000 to April 2005) corresponds with an increase of budgetary support from the government and the looming drought of 2001/2002, during which the FRA's role was expanded. During this period, FRA maize purchases were estimated to account for roughly 10% to 30% of the total quantity of maize marketed by small- and medium-scale farms. FRA started announcing maize floor prices during this period and became a so called 'buyer of last resort'. This phase marked the re-introduction of pan-seasonal and pan-territorial pricing for the first time since the dissolution of NAMBOARD in 1989. It was during this phase that Zambia faced serious maize shortfalls which called on the government to stabilise the market without hampering private sector participation and market development. Unfortunately, the delayed, ad-hoc and mixed government actions led to huge price spikes and market instability. This phase has the highest price volatility, mainly because of the ad hoc policies and unpredictable operations of FRA.

Figure 8: Comparison of Coefficient of Variation by FRA market involvement



Source: Author

The third phase started a year before the national election in 2006, which saw a much more expanded role of the parastatal FRA's mandate in Zambia's maize sector. The period starting from May 2005 to the current day has seen FRA ramping up its buying activities. Contrary to the maize price stabilisation objectives pursued by the Zambian Government, the level of volatility in the second and third phase suggest that the government marketing and trade policies actually had a destabilising effect on maize prices. This does not mean that the policy tools themselves are unable to stabilise prices; rather, the main reason for the results has to do with how the policies were implemented (especially phase 2).

The most important policy-related contributors to food price volatility were the time lags between the announcement of import duty waivers and the actual waiver, and the time lag between announcement of government imports and actual importation. Both delays exacerbated the maize price spikes during the 2001/02, 2002/03 and 2005/06 seasons (Figure 7).

Table 1 summarises some of the trade policy shifts since the 1990's. The Ministry of Agriculture at times imposed import and export restrictions by issuing less permits and/or deliberately delayed their issuance. Nevertheless, all these ad hoc trade restrictions have often distorted the market and created trade uncertainty among the private players, resulting in food shortages and price spikes.

Table 1: Key agricultural policy changes and maize marketing over the years

1991/92	• Economic Structural Adjustment Programme initiated in 1991. Donors provide balance of payment support for fertiliser importation. Private trade legalised as NAMBOARD is abolished in 1990. • Maize meal subsidies reduced in late 1991.
1992/93	• Government removes import and export restrictions and liberalises foreign exchange market. However, severe drought delays maize market reform. Government sets floor price, into-mill, and consumer price of maize.

1993/94	• Government appoints rural banks and co-operatives as buying agents for maize. • Government unable to maintain maize floor price.
1994/95	• Government announces total decontrol of maize producer prices and elimination of transport subsidies. Privatisation of state-owned milling companies. • Formulation of the Agricultural Sector Investment Programme, a tool for implementing the government policy of maize market liberalization and market reform, 1994.
1995/96	• Government imposes an export ban on maize grain and maize meal. • FRA established to manage the national food reserve.
1997/98	• FRA takes over maize input distribution on credit to smallholders. • Pan-territorial pricing re-introduced for FRA-distributed fertiliser; makes private sector fertiliser uncompetitive in outlying areas.
2001/02	• Government proposes the Crop Marketing Authority as a semi-autonomous body corporate: a buyer of last resort whose main preoccupation is to stabilise prices and create markets in remote areas while procuring and selling at market prices and remaining self-sustaining.
2002/03	• Government bans importation of genetically modified organism (GMO) maize.
2003/04	• Export permits not issued, effectively banning maize exports. • Government legislation gives powers to local authorities to introduce local taxes. Inter-district grain levies put in place.
2004/05	• Government raises maize import duty to 15%. • Government issues export permits to selected trading/milling firms. • Amendment of the FRA Act to include crop marketing and maize price setting in addition to its original mandate of managing national strategic food reserve.
2005/06	• Government restricts export permits to traders and provides FRA with *de facto* monopoly on the export of maize. • Maize stock monitoring committee put in place to report on stocks monthly. The Ministry of Agriculture's rationale is to guarantee national reserves before issuing export permits and to supply maize meal at affordable prices.
2006/07	• Target for strategic reserves revised from 80,000 MT to 200,000 MT.
2007/08	• Government announced intent to discontinue subsidies to millers at the end of March 2009.
2011/12	• High food prices, Government subsidises maize to millers. • Maize export ban put in place.
2012/13	• FRA maize subsidies to millers continues. • Maize export ban lifted and reintroduced.
2014/15	• Maize export ban lifted. • The Agricultural Credit Act is signed.
2015/2016	• Political pressure to ban exports due to El Nino • 2016 Election year, Minister of Agriculture in May announces temporary export ban until after elections. FRA to purchase 1,000,000 MT of maize at 75 Kwacha/50kg, approximately US$150/MT (market price at about US$180/MT)

	• President announces an increase of FRA purchase price to 85 Kwacha/50kg (market price at about US$190-200/MT) • Regional deficits put pressure on local maize prices. Private sector very active in market. Government failed to reach one million purchase target.

Sources: Howard and Mungoma 1997; Govereh, Jayne, and Chapoto 2008; Jayne et al. 2009; Authors' illustrations.

2.6 Trade Policies

Since the 1960s, the government has often used discretionary trade policy instruments, such as: temporary export bans or restrictions, import tariff duties or bans, and other government import programmes to keep food prices low and ensure that the country's food security objectives are not jeopardised. The government has tended to use trade policy tools to respond to maize supply shocks or world food price shocks to protect the local market from escalating maize or maize meal prices. Additionally, the government has used trade policy tools to regulate the wheat sector with the aim of ensuring that the country reaches self-sufficiency - an objective that was attained a few years ago.

In shortage years, the FRA sometimes imports maize in competition with the private sector. As a result, the government becomes one of the biggest trader on the market. In contrast to private traders, the government is not a profit-maximising institution, and instead pursues social and political objectives. To keep consumers happy the government endeavours to keep retail prices low, whilst simultaneously trying to make the smallholder farmers happy by raising producer prices. This inevitably leads to a conflict between the government and traders because of differing objectives.

In addition, during deficit years, the government imposes export bans and restrictions to keep stocks in the country. The government executes its import and export controls by controlling the number of firms that have access to import and export permits. As such, only a few selected millers, private firms, or organisations are permitted to engage in cross border trade when trade controls are in effect. However, these restrictions are often not effective as they lead to increased informal exports, and loss of government revenue and foreign currency earnings, and tend to raise the cost of maize and maize meal for consumers.

Zambia's agricultural season is similar to that of other countries in the region. As such, these countries experience similar effects from changes in climatic conditions. For example, a drought in Zambia entails a drought in the whole region, and ultimately a regional deficit in grain supply. The government response in such instances has been to impose an export ban for fear that millers and traders will export most of the domestic stock to higher priced markets and exacerbate food security problems in the country. However, contrary to government's assertions, export bans have not been effective as illegal trade continues because of many porous borders. Zambia is currently unable to implement strict border policing required for the bans to be effective. This situation is exacerbated by the fact that Zambia is a landlocked country with eight neighbouring countries. (Nijhoff *et. al*., 2003; Mwanaumo *et. al*., 2005; Govereh *et al*, 2008; and Mason and Myers, 2009)

In 2015/16, for example, Zambia produced a maize surplus whilst other countries in the region (especially Malawi and Zimbabwe) faced huge deficits. Zambia put in place export restrictions and this

led to a reported increase in illegal trade of both grain and maize meal due to price incentives arising from maize deficits in the region. Traders sought to take advantage of these incentives despite the export ban, leading to speculation about the availability of these commodities and subsequent increases in local prices.

3. Food Security and Price Stabilisation Policy in Zambia

In a liberalised market economy, the private sector is expected to effectively serve the needs of the millions of rural farmers and urban consumers, whilst the government is expected to provide a conducive environment and regulatory framework to benefit all stakeholders. Unfortunately, with a history of government intervention and the political economy surrounding maize, the private sector in Zambia is often the scapegoat of choice whenever prices rise beyond bearable levels due to global price changes or weather shocks. The perceived failure of the market has led the government of Zambia to continue intervening in an attempt to stabilise prices.

The Zambian government pursues price stabilisation and food security objectives through three main channels. The first is through the FRA which buys grain from farmers, arranges grains imports, and releases stock at subsidised prices. The second is through the provision of subsidised inputs (mainly fertiliser and maize seed) to smallholder farmers to increase production. The third is a transfer programme that assists vulnerable households through a food security pack (maize seed and fertiliser for a quarter of a hectare), and social cash transfer through the Ministry of Community Development, Mother and Child Welfare. These programmes are discussed in more detail below.

3.1 Price Stabilisation and Modalities of Intervention

There are several actors involved in dealing with grain shortfalls and surpluses in Zambia, including: government, private traders, millers, the Zambia National Farmers Union (ZNFU), non-governmental organisations, and food aid agencies (particularly the World Food Programme - WFP).

Private traders have often advocated for open grain border policies to regulate domestic deficits and surpluses. Millers use their position at the centre of the supply of maize meal and wheat flour to consumers to lobby for subsidised grain public stocks. In addition, the large millers have often lobbied for open border policies for maize meal and wheat flour.

In deficit years, the government prefers to use direct public imports through the FRA, export bans/restrictions and consumer subsidies through the release of subsidised grain to selected large-scale millers as the main policy options. Additionally, in any given year relief food is normally distributed to disaster areas by the Disaster Management and Monitoring Unit (DMMU) under the Vice President's office. More recently, the government has promoted rural solar milling plants through the Zambia Cooperative Federation as a way of cushioning maize meal retail prices to consumers.

In surplus years on the other hand, the government prefers to procure local grain through the FRA at above market prices to support smallholder farmers' prices, and direct FRA exports to deficit countries through government to government deals.

Other important players in maize include the ZNFU and WFP. The ZNFU has in recent years been involved as a buyer and exporter of maize and wheat, in addition to lobbying for better prices for farmers. Amongst the food aid agencies, the WFP is the major player in the Zambian grain market. WFP procures grain from the FRA and/or from farmers through private traders for export to neighbouring deficit countries, to use in the local school feeding programmes, or as relief food in locally affected areas. All these actors respond in related ways to the pressures and opportunities created by the recurrent grain supply shocks.

3.2 Government Intervention for Food Security

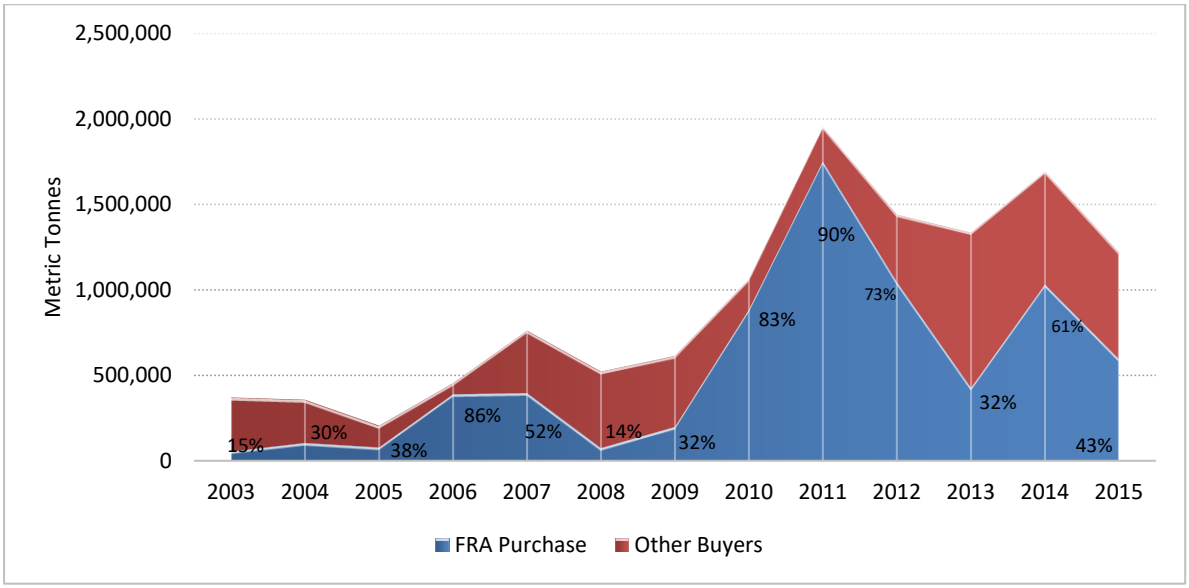
Procurement and management of SGRs

The FRA is a government institution under the auspices of the Ministry of Agriculture mandated to hold national food reserves in Zambia. The FRA is mandated through the Food Reserve Act of 1995 to manage national strategic food reserves, and ensure national food security and income through quality marketing and storage services. It was established with a strict mandate of buying and holding only national strategic commodity reserves to meet acute local shortfalls in supply. Up until the 2000/2001 marketing season, FRA involvement in the buying and selling of grain was very minimal, and all purchases and sales were done by the private sector using a tender process.

However, with an increase in government budgetary support and the looming drought of 2001/2002, the FRA positioned itself to become one of the major players in the maize market. In 2005, a year before national elections, the FRA's mandate in the maize sector was further expanded to include the provision of market access for rural smallholder farmers. Since then, the FRA has become the major market player in maize markets, buying over 70% of production in 2007, and between 25% and 50% of production during other years, as shown in Figure 9.

An amendment to the FRA Act in 2005 authorising the FRA to participate and engage directly into maize marketing has seen the scope of the FRA's maize buying and selling expand to unsustainable proportions. The expansion has led to the crowding out of private sector players in the market with undesirable implications on maize marker development.

Figure 9: Maize purchases: FRA versus other buyers, 2003/04 to 2014/15 marketing years



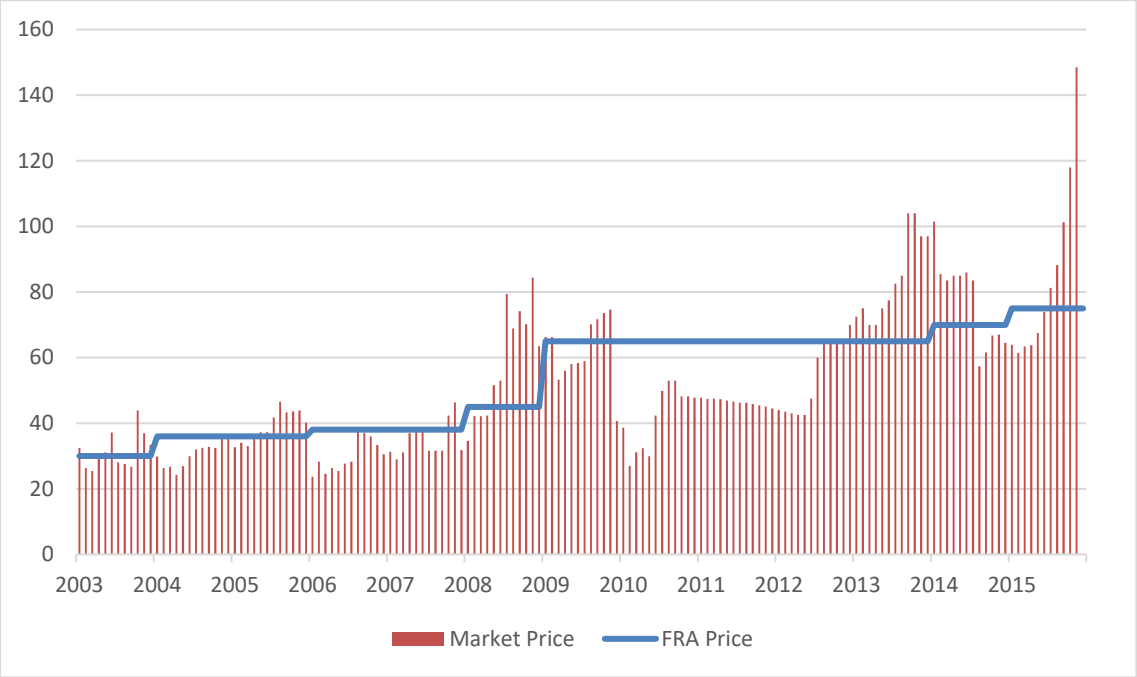
Source: CSO/MAL Crop Forecast Surveys (CFS) and Post-Harvest Surveys (PHS); 2004 and 2008 Supplemental Survey to the CSO/MACO/FSRP Post-Harvest Surveys.

Notes: The percentages represent FRA purchases as a percentage of projected total maize sales

The SGR was increased from 300,000 to 500,000 MT in 2010 following stakeholder consultations where a comprise was made not to triple the size of the SGRs. Stakeholders argued that there was no need for an increase because Zambia was now better placed to deal with any shocks without the need to hold such huge and expensive stock levels. For example, the country's irrigation capacity had increased in the past two decades to almost 150,000 hectares. This meant that commercial farmers at short notice could be contracted to produce maize to fill any anticipated shortfalls. In addition, despite increases in population, consumption patterns have changed—demand for non-maize food products is increasing (Chapoto *et al.*, 2015).

To achieve its goal of ensuring national food security, the FRA uses both demand-side and supply-side intervention modalities. On the demand side, the FRA purchases maize grain from smallholder farmers between July and October of each year as mandated by the amended FRA Act. In addition, since 2004, the FRA announces a pan-territorial and pan-seasonal price at the beginning of the crop-marketing season. Private buyers engaging in maize markets can sell either below or above the set FRA price, although buyers buying below the price are considered unscrupulous as it is largely believed that the price set by FRA should be the minimum price. Moreover, the FRA maize price has often been above the average wholesale price for maize with some exceptions as shown in Figure 10.

Figure 10: Comparison of FRA pan territorial prices to Lusaka nominal maize market price



Source: Ministry of Agriculture Market information Centre 2003-2015, IAPRI provincial data collection programme, 2016 AMIC, and FRA announced prices

On the supply-side, the FRA releases subsidised maize stocks to large-scale millers who are required to sign an agreement with the government to reduce the wholesale price of maize meal to pass the subsidy to consumers. While only making up a small amount of FRA maize, FRA also engages in direct transfers of maize to households through the DMMU and the WFP. Further, some of the maize purchased by the FRA is exported to neighbouring countries or sold directly to households through FRA district offices. In normal years, FRA-procured grain stocks can be disposed of to commercial millers and traders through a tender process.

Farmer Input Support Programme (FISP)

Unlike the FRA that is targeted at maize output markets, the Ministry of Agriculture (MoA) also manages a Farmer Input Support Programme (FISP), whose main objective is to secure the country's food security through smallholder maize production by improving their access to affordable inputs. FISP was implemented in 2003, with three significant changes since its inception.

From inception in 2003 until 2009, smallholder farmers targeted by the programme were given a subsidy pack equivalent to one hectare of maize. The pack contained 200kg of ammonium nitrate, 200kg of Compound D fertiliser, and 20kg of hybrid seed. The farmers were required to pay 50% of the price for fertiliser and 40% for seed. During this period, about 11% of the now more than 1.6 million farmers benefitted from the programme. When the programme was established, the MoA expected that farmers would be on the programme for not more than three years. They would then graduate from the subsidy, as they were expected to have improved their productivity and levels of production in that time frame. However, this has not been the case, and the subsidy programme has continued to be implemented and expanded (Table 2).

Table 2: FISP and FSP budget allocations and beneficiaries 2003-2016

Year	Budget allocation to Farmer input support programme	Target FISP Recipients	Budget allocation to Food Security Pack (FSP)	FSP as a percent of FISP total budget
	(US$)	(Number)	(US$)	(%)
2003	10,570,825	150,000	847,154	8.0
2004	20,512,843	115,000	6,291,191	30.7
2005	31,387,494	125,000	4,672,585	14.9
2006	51,123,863	210,000	4,500,533	8.8
2007	50,879,874	125,000	2,648,581	5.2
2008	131,220,659	200,000	3,105,599	0.1
2009	111,905,323	500,000	1,980,198	1.8
2010	122,710,000	891,500	2,083,333	1.7
2011	184,237,111	914,670	3,086,420	1.7
2012	165,596,550	877,000	4,854,369	2.9
2013	113,137,278	900,000	4,935,185	4.4
2014	187,985,303	1,000,000	8,130,081	4.3
2015	183,296,952	-	6,063,218	57.4

Source: MoFNP (Budget allocation) and Ministry of Agriculture implementation manual for FISP target recipients

At the advice of Indaba Agricultural Policy Research Institute (formerly Food Security Research Project), a Zambian Think Tank, the subsidy pack in 2010 was reduced to a half-hectare pack. This was mainly because the majority of smallholder farmers are land constrained, as they cultivate less than one hectare of maize. This implies that the benefits of the subsidy were accruing to wealthier households who would buy some of the subsidised fertiliser from farmers who did not need it. The government embraced the recommendation for it would double the beneficiaries without increasing the costs of the programme. During this second wave, it was estimated that about 30% of farming households benefitted from the programme. However, the benefits of the programme are accruing to the wealthier households instead of the poorer households that need the assistance.

Evidence on the impact of FISP suggests that the programme has minimal impacts on poverty, food security and smallholder farmers' income due to implementation challenges. This includes late delivery of inputs, with 22% and 35% farmers reporting late receipt of inputs in 2010 and 2014 respectively (RALS, 2012; RALS 2015). Nkonde (2016) reported that the late receipt of inputs was associated with a 4.2% reduction in input use efficiency and yield losses of more than 85,000 MT.

In 2015, the government embraced the recommendation to implement the FISP programme through a flexible e-voucher programme to promote agricultural diversification and crowd-in private sector input distribution. Thus, the MoA implemented a pilot e-voucher system in 13 districts during the 2015/16 agricultural season and expanded the pilot to 40 of the 105 districts in 2016/17 season and countrywide roll-out in 2017/18 agricultural season. This innovation is expected to promote agricultural diversification by empowering beneficiary farmers to: purchase inputs of their choice at their nearest input outlets; ensure timely access to inputs by smallholder farmers; help minimise

administrative burden and costs as the government cedes the role of input importation and distribution of inputs to fertiliser firms and agro-dealers.

Food Security Pack (FSP)

The Food Security Pack (FSP) is a government transfer programme aimed at ensuring food security, alleviating poverty and reducing malnutrition through increased crop production among vulnerable households. The pack includes cereals, legumes, cassava cuttings or sweet potato vines, fertiliser and lime. The programme began in 2000 and is implemented by the Ministry of Community Development, Mother and Child Health (MCDMCH). In 2010, the FSP programme was expanded, and an electronic voucher system introduced to make it more efficient in the distribution of the pack.

The programme targets subsistence farmers, including female and child headed households, and those taking care of the disabled and disadvantaged. The main challenge for the programme is the lack of adequate budgetary support to make a meaningful impact. However, there is evidence to suggest that this programme is more targeted and is implemented better than FISP. The budget and number of recipients since the programme's inception are show in Table 2 above.

Recommendations have been made for the allocation of more significant resources towards the expansion of the food security pack as it is a much smaller pack with a well-defined target, unlike the current recipients of FISP who are supposed to be "Vulnerable but Viable", a definition that makes targeting more challenging.

Social Cash Transfers

Another programme targeted at vulnerable households is the unconditional Social Cash Transfer programme (SCT)[3], which was launched as a public programme together with the FSP in 2003. The SCT programme is based on a community administration framework that is managed by the Social Welfare Department under the MCDMCH and supported by the Department for International Development (DFID) and the United Nations Children's Emergency Fund (UNICEF). The programme is 80% funded by the government. The programme targets 10% of the most destitute households in the population. The aim of the programme is to reduce extreme poverty and hunger among these households.

Initially, the programme used various targeting approaches to determine household eligibility. However, since 2013, a harmonised targeting approach was developed with eligibility based on residency, incapacitation and welfare level. The new targeting process uses a multidimensional measure that assesses household vulnerability based on various characteristics including household dependency ratio, amenities and asset ownership. Eligible households are entitled to receive ZMW 70 per month, but this is disbursed bi-monthly at ZMW 140. Households having people with disabilities receive double the SCT amount.

The programme was initially piloted in five districts between 2003 and 2009, and after improving consumption and reducing poverty among participating households, the government decided to scale it up. In October 2013 government announced an 800% increase in its budget allocation to SCTs and

[3] Information on SCT has been largely obtained from DFID development tracker, https://devtracker.dfid.gov.uk/projects/GB-1-200625/documents

as of 2014, the programme was reaching 136,000 recipients in 50 districts, with a further 35,000 to be added to the programme.

The SCT programme has undergone strict monitoring and evaluation in order to assess impacts on hunger and extreme poverty among destitute households before scale-up. The programme has achieved strong impacts on consumption, material wellbeing and productive investment. Programme outcomes have been measured through impact evaluations of the Child Grant Programme (CGP) and Multiple Categorical Grant (MCG) targeting approaches. Overall, among SCT recipients, the number of households having no more than one meal a day has reduced from 21% in 2010 (baseline) to 10% in 2014. The reduction is consistent with another evaluation, which found that SCT households having one meal a day dropped from 19% at baseline (2005) to 13% during evaluation (Chiwele, 2010). Further, 81% of SCT funds were spent in the communities they were disbursed in, thus strengthening the economic activity of the local area.

Another recent evaluation of CGP by Handa et al, 2015 shows that the increase in consumption observed among households receiving the SCT is close to the per capita value of the transfer, as is the expectation among very poor households. Findings show that SCTs increased total per capita consumption spending by ZMW 15.18 per month, greater than the average per capita value of the transfer of ZMW 12 (though not significantly so). Consumption patterns among recipients also showed increased diet diversity, as there is a clear shift away from roots and tubers (primarily cassava) towards protein (dairy, meats). The overall increase in food spending among recipient households was ZMW 11.60. The largest share of this increase went to cereals (ZMW 4.54), followed by meats, including poultry and fish (ZMW2.44), fats such as cooking oil (ZMW 1.76), and sugars (ZMW 1.28).

The biggest challenge with programme implementation is consistent delayed government budget release. For example, the total government budget for the programme in 2014 was ZMW 150 Million (US$15 million at current exchange rate 1US$ to ZMW10) but only 70% of the funds were released. A similar trend was observed in 2015. Other challenges cited include low literacy levels among local community administrators of SCTs creating problems regarding targeting the right beneficiaries.

3.3 Governance, Government Intervention, and Use of Trade Policy Tools

This section draws heavily from the analysis by Chapoto *et al*., 2015 who through interviews with key informants helped to identify public and private actors who are influential in maize sector policy development in Zambia. The main actors identified included the State House/Cabinet (hereinafter referred to as the Executive), MoA, Ministry of Finance and National Planning (MoFNP), ZNFU, Millers Association of Zambia (MAZ), and Grain Traders Association of Zambia (GTAZ). These actors interact in various ways, and influence how and which policies are enacted in the maize sector.

At government level, the agricultural policy planning process involves several players including the MoA, MoFNP, and the Ministry of Justice and Legal Affairs. Any agricultural policy changes or new policies are communicated to the Cabinet through a Cabinet memo. The Policy Analysis and Coordination (PAC) division in the Cabinet office then sends the memo to relevant ministries for review before the relevant Cabinet Committee makes recommendations to the full cabinet for approval, and the policy decision is communicated back to the Ministry for implementation (Koenen-

Grant and Garnett, 1996). Policies that are approved by Cabinet for implementation are usually administrative policies. Policies that require enactment of new act(s) or laws are taken to Parliament for debate and vote on the proposed bill. However, it is very rare that Cabinet recommendations fail to pass through parliament because debates and voting are conducted along party lines.

The Executive plays a very significant role in the development and implementation of agricultural policies, especially in the maize sector. The rural smallholder farming community is of great interest to politicians as they constitute the largest voting bloc in the country. Hence, to win the rural vote, the politician must win over the hearts of smallholder farmers by having programmes and/or policies targeted at them. The fear of losing elections has contributed, in many ways, to the high level of ad hoc maize marketing and trade decisions made by the government. As an arm of government, the MoA has often been forced to justify and implement decisions announced from the top. Therefore, maize sector policies can be formulated at technical level, but decisions are made at political level.

On the other hand, the ZNFU, MAZ and the GTAZ represent the interests of their members and usually lobby government for programmes that benefit their constituents. ZNFU and MAZ have significant influence due to their connections to farmers and consumers respectively, the largest voting blocs. Unfortunately, policy changes benefiting selected stakeholders have often resulted into worse price instability or food crises.

4. Impact of Interventions

There exists significant evidence on the effects of stabilisation policy tools rather than transfer tools, as they are the major intervention modality through which the government achieves its goals on food security. This section therefore focuses mainly on the impacts of the FRA buying and selling activities and the management of the SGR. To unbundle the effects of FRA policies on maize prices, household incomes, and consumption, it is important to first highlight the distribution of producers and maize and maize meal consumers in the country, to observe the individual effects on these groups.

4.1 Impacts on Smallholder Households and Maize Producers

Smallholder farmers are responsible for more than 90% of the country's maize production (MoA, 2016). However, the majority of these farm households are land constrained despite the country having one of the lowest population densities in the world of approximately five hectares per person. This is because most settlements follow areas with infrastructure, and vast areas of land are currently not habitable due to lack of infrastructure. The Rural Agricultural Livelihood Survey (RALS) carried out in 2015 shows that 61.7% of the rural smallholder farm households cultivate less than 2 hectares of land. These results that are similar to those found by Hichaambwa and Jayne, 2011 using a different nationally representative survey. Approximately, 29% of the households cultivate one hectare or less. These households are mostly poor, of which 46% of households in the lowest two income quintiles cultivate less than one hectare (18.3% of all the rural farm households) (Table 3).

Given such small landholdings, these households are not able to produce a surplus for sale and are less likely to earn sustainable incomes from cropping, unless substantial investments in productivity enhancement are made, and high-value crops are promoted (Chisanga and Chapoto, 2015).

Table 3: Landholding Distribution among Smallholder Farmers in Zambia

Land Categories			Income quintiles				
			Lowest	2	3	4	Highest
	Number	(%)	(%)	(%)	(%)	(%)	(%)
Less than 0.5	165,010	10.9	5.0	1.8	1.2	1.1	1.8
0.5–1.0 ha	273,842	18.1	6.7	4.8	2.9	2.0	1.8
1.0–2.0 ha	495,007	32.7	5.9	9.2	8.0	5.7	3.9
2.0–5.0 ha	474,717	31.4	2.3	4.0	7.5	9.7	7.8
5 ha or more	103,802	6.9	0.1	0.2	0.4	1.5	4.6
All farmers	1,512,378	100.0	20.0	20.0	20.0	20.0	20.0

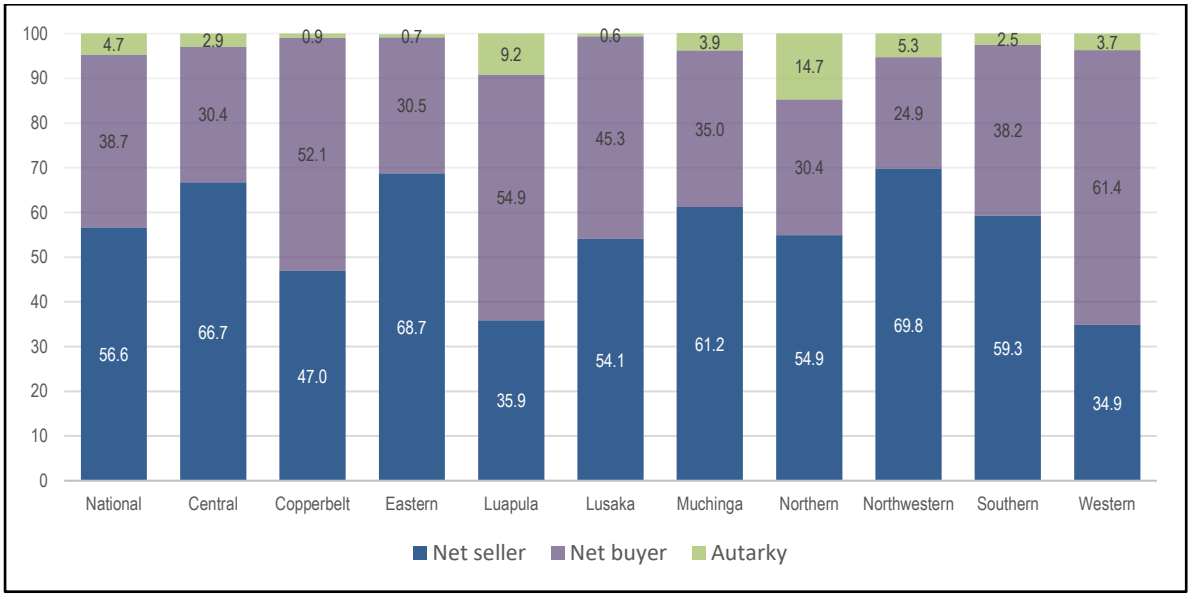
Source: CSO/MAL/IAPRI 2015

Figure 11 shows the categories of Zambian smallholder rural farmers by maize market position. Generally, the net buyers of maize, constituting approximately 38.7% of the rural households are disadvantaged by high FRA prices. This percentage varies by province and fluctuates with the status of the agricultural season, higher in deficit years than in surplus years. Chisanga and Chapoto, 2015 show that these households are generally poorer and have smaller farm sizes and asset holdings than the median rural household.

Another important fact about the rural smallholder farmers is that their maize surplus generation is highly concentrated, with only 59,961 (4.6%) of the households that produced maize in 2015 responsible for the supply of 50% of all the maize sold among the smallholder farmers. Such high market concentration is not peculiar to the 2015 season (see Tembo *et al.,* 2010; Nkonde *et al*., 2011; Kuteya and Chapoto, 2015). In addition, in the same year, 47.5% did not produce enough to have a surplus to sell.

The implication of this market structure is that the FRA policy of buying grain at above market price only benefits a small percentage of farmers. However, the majority of the poor smallholder farmers and consumers are hurt because they are net buyers as shown in Table 3. The net buyers are very poor smallholder households. meaning the price stabilisation policy which aims at buying grain from rural farmers actually disadvantages them since they are required to purchase maize grain. Alternatively, these farmers could be assisted with their liquidity constraints to smooth their consumption as they wait for the next agricultural season. Such liquidity could be provided through an unconditional social cash transfer.

Figure 11: Maize market position for smallholder farmers in Zambia



Source: CSO/MAL/IAPRI 2015

Notes: Net sellers sell more maize than they purchase; net buyers purchase more maize and maize products than they sell; and households that are neither buyers nor sellers do not participate in maize markets.

On the other hand, the households selling maize have, for obvious reasons, tended to advocate the continuation of government procurement of their grain, supporting the FRA and looking for fixed, high prices. Unfortunately, the above statistics suggest that the overall benefits from such government programmes are minimal (Myers 2006; Govereh, Jayne, and Chapoto, 2008).

4.2 Impact on Urban Consumers

As discussed in section two, the urban population makes up about 42% of Zambia's national population and have varied consumption patterns depending on expenditure/poverty levels. Total poverty levels in the urban population are estimated at 23%, with 13% being extremely poor, 11% being moderately poor, and 77% being non-poor (LCMS, 2015). For this group, maize consumption is largely through commercially milled maize meal. Commercially milled maize meal is packaged in 5kg, 10kg and 25kg bags.

The urban population, while showing more diversity in staple food consumption, still has households in the low-income groups consuming substantial amounts of maize meal. Furthermore, most low income urban consumers cannot afford formal sector retail prices for commercially packaged maize meal. Instead they rely on daily purchases of expensive repackaged maize meal (known locally as Pamela) purchased from vendors in the market (Mwiinga *et al.*, 2002; Mason *et al.*, 2010). Mason and Jayne (2009) and Chisanga (2016) show that maize meal purchased in repacks cost 27% more than the 25kg bag. Those with little or no income resort to skipping meals or switching to less preferred diets.

4.3 Impact on Maize Prices

Given the large maize and maize meal consumption among different population groups, it is in the government's interest to ensure that the price of maize is stable, as high prices and very volatile prices cause hardships to the poor. Indeed, maize price stabilisation has been a specific and key FRA

objective, justifying the governments' interventions in maize markets. The rationale behind keeping maize prices stable is not only to ensure that people are able to purchase and consume staples, but to also encourage farmers to produce more.

However, as discussed earlier, ad hoc government interventions have not helped stabilise prices in shortfall years. Instead, prices have in some years gone above import parity because of government failure to creatively utilize SGRs held by FRA. Also, the government's disinterest in using private imports supplement the SGR has often led to grain import delays among the private sector, resulting in prices spiking above import parity as shown in Figure 7 in Section 2.

Mason and Myers (2011) show that FRA activities have impacted maize prices by setting a pan-territorial price and being a major purchaser in the market, significantly raising average market maize price levels. They estimated that FRA purchasing activities increased mean maize market prices by 19% between 1996 and 2008. This means that the setting and announcement of the FRA buying price pushes the price surface as farmers view this price as the floor price. Further, FRA acts as a monopsony as it is the largest player in the market and can hence influence price.

In the same study, Mason and Myers, 2011 reported that between 1996 and 2008 FRA activities reduced maize price volatility, though at above normal market levels. They reported that wholesale maize prices would have been more volatile in the absence of FRA activities, with the covariance of maize market prices reduced by 34-36% with FRA presence.

On the contrary, Govereh *et al*. (2008) and Chapoto and Jayne (2009) found that the FRA had very weak, and no significant long-term, maize price stabilisation effect . Instead, when they compared government intervention to a counterfactual scenario of no government intervention, they found that the coefficient of variation of maize prices in the 'no intervention' scenario was between 4.3% and 10% lower than that in the 'government intervention' scenario. Therefore, the variability of maize prices was higher with government market and trade policy interventions, suggesting that FRA and trade policies have to some extent destabilised maize market prices in the country.

However, in support of Mason and Myers' (2011) results, Chapoto and Jayne (2009) reported that FRA market participation had significant short-term stabilising maize price effects. Thus, FRA activities resulted in seasonal price stability, as the price of maize remained largely the same during both the harvest period and hunger periods due to pan territorial and pan seasonal pricing.

These studies highlighted the negative impacts of unpredictable and ad-hoc government marketing and trade policies/interventions, which resulted in more volatile and higher prices in times of crisis. For example, delays in importing or waiving import duties during deficit years led to significant increases in maize prices in the short term. This is because delays in imports caused stocks to dwindle as private firms panicked and rationed available stocks in response to government pronouncements. Such panic led to market prices skyrocketing during the supply deficit years in 2002, 2003, and 2009 marketing seasons (Nijhoff *et al*., 2003; Mwanaumo *et al*., 2005; Chapoto, 2011). Chapoto and Jayne (2009) found that delays in maize imports and in waiving import duties led to monthly price increases of up to 30% and 17% respectively, for every months' delay in policy implementation.

Govereh *et al*. (2008) further iterated that the destabilising effect of government interventions largely came from ad-hoc trade policies, rather than from the purchase and sale of maize by FRA. Prices skyrocketed because traders increased the risk premium they built into their trading margins due to high risk created by unpredictable government policy.

4.4 Impact on Income and Consumption

Interventions aimed at ensuring national food security have had very little impact on the incomes of the poorest households. As indicated above, while there has been an increase in the average price of maize, there are very few poor households that sell to FRA and benefit from this price increase. Instead, 39% of rural households are net buyers of maize, and have therefore been negatively impacted by these price increases in the sector. Poverty is highest in the rural areas, where 66% of the population are extremely poor and 16% are moderately poor. Therefore, average maize price increases entail greater spending by poor households to purchase staples. Only large-scale commercial farmers and a few well-off smallholder farmers have benefitted from increased average maize prices translating into increased income.

In addition, maize meal consumption in Zambia is greatly serviced by small-scale millers (hammer millers). According to the RALS 2015, only 4% of rural households in Zambia rely on commercially milled maize meal from larger millers who are mostly situated in urban centres. Essentially, the urban market has transformed, with some consumers being serviced by small-scale hammer millers situated in high density urban markets. However, this market is highly seasonal due to the availability of maize in the informal market, which in turn is also seasonal and constrained by highly centralised maize purchasing activities by the FRA, large grain traders, and millers. Making maize available to these communities throughout the year would provide poor consumers with an alternative, and competitively priced maize meal.

Another group that has benefitted from government interventions are the commercial millers that are able to access subsidised maize from the FRA. Further, traders of repackaged maize meal also benefit substantially, as they gain relatively more for every unit increase in the market price of maize meal. While millers access subsidised maize from the government, this is not translated into reduced commercial maize meal prices. Instead, prices of commercially milled maize meal have been increasing, affecting mostly the urban poor who must spend a bigger part of their income on maize meal purchases (Kuteya and Jayne, 2012; Sitko and Kuteya, 2013). This is because it is difficult to enforce the price agreements in a free market, especially if there are opportunities to make more money elsewhere. For example, it is difficult for the government to curtail the movement of subsidised maize meal to border areas where prices are much higher due to the demand from consumers in neighbouring countries.

Leading on from the impacts on prices and incomes, to the extent that they raise average maize market prices in Zambia, government interventions in maize markets have been regressive, with higher maize prices harming both urban consumers and a large proportion of rural households (Mason and Myers, 2011). Poor households spend close to 48% of their total food budget on staples (Chisanga and Zulu-Mbata, 2018). As such, the average price increase in maize, and additional increases that

occur due to poor policy interventions during crises, have had a disproportionately worse impact on the poorest in the population.

In addition, government interventions have affected consumption through reducing the substitution of maize consumption with other staples. Before the expansion of the FRA and FISP between 1996 and 2003, Zambia's agricultural production and consumption was becoming more diversified. Production of other foods like cassava, groundnuts, sweet potatoes, and animal products was increasing. However, with ratcheting up of the two subsidy programmes and direct promotion of maize production through various government policies, production and consumption of other staples and food commodities at household level have reduced. This has been especially the case in rural areas, where increased maize dependency has resulted in decreased consumption of crops such as sorghum and millet. In urban areas, other staples such as wheat and rice are taking on more prominence as household income levels go up, but maize remains the main staple consumed among poorer households.

4.5 Impact on the Treasury

FRA policies have exerted a huge fiscal burden both on the national and agricultural budget in the country. The money used to buy grain comes from commercial lenders, thus imposing an opportunity cost to the growth of other sectors within and outside agriculture. There is clearly a crowding out effect in the commercial financial markets created by the government when they borrow money to finance maize related purchases under the FRA, as well as FISP. Currently, FISP and FRA take up more than 98% of the MoA budget for Poverty Reduction Programmes and since 2009, more that 50% of the total MoA budget. This leaves very little resources for other drivers of agricultural growth such as research and development, extension, irrigation and/or animal disease control.

Other costs arising from FRA operations are the quality losses in maize that are incurred by the Agency when it buys above the SGR. It is estimated that FRA loses about 15-30% of the grain it purchases due to poor storage as most of the maize is stored on slabs and under tarpaulins. The absence of adequate silo space in strategic locations makes it impossible to avoid these losses. Currently, the FRA have about 850,000 MT grain storage capacity and has plans of expanding this capacity to 2 million MT by 2018. However, this policy fails to take advantage of private sector appetite to build new storage or lease current FRA storage.

Chapoto *et al* (2014) estimated that the FRA could lose almost US$100 million by buying 426,248 MT and storing the maize for at least eight months, plus the costs of the carry over stock from the previous season. All factors constant, and assuming a conservative 15% storage loss, the SGR of 500,000 MT strategic grain stocks stored for at least eight months would cost the government more than US$150 million through storage losses, shrinkage, storage costs, interest payments, and selling the maize at a loss. Given that FRA maize purchases benefit the more well-off farmers who are able to produce a surplus to sell and disadvantage poor net buyers, the estimated losses could be used to enhance other social transfer programmes.

As an example, if the government reduces the current SGR to 250,000 MT (three months' supply of grain), the country could potentially save more than $50 million. These savings could be used on other

social welfare programmes, such as the cash transfer programme. At current levels of social cash transfer support, this money could reach more 500,000 more beneficiaries. In addition, buying a smaller SGR would enable the government to avoid budget overrun and late payments to farmers. As a result, the private sector participation in the maize sector would grow and investments into storage enhanced. Although such a transition might initially cost the government some political capital, in the long-run, with better outcomes for more constituent groups, the government can take credit for improving smallholder and urban consumer welfare through an effective cash transfer programme in the country.

4.6 Regional Effects of Price Stabilisation Interventions

While use of trade policy tools has been justified based on ensuring national food security in Zambia, ad hoc trade restrictions have negatively impacted maize market stabilisation in the region. Zambia is well placed to be a "bread basket" for the region due to its geographical position. Notably, Zambia shares a border with eight countries. It would therefore be unrealistic to assume that Zambia can fully insulate itself from regional demand.

For example, maize grain prices in March 2016 were 43.2% higher in Malawi, 47.3% in Zimbabwe and 32.5% in Kasumbalesa, Democratic Republic of Congo (DRC). This meant maize grain and maize meal would formally and informally move to these deficit markets. Reports of shortages in some parts of Zambia led the government to suspend exports to neighbouring countries.

Unfortunately, this only exacerbated the incidences of informal exports and the Zambian government responded by putting soldiers at border towns to stop illegal exports of maize grain and maize meal. As such, due to illegal exports, grain subsidies to millers in the country have ended up subsiding regional consumers of exported maize meal. This is especially the case for the DRC and Malawi markets. Instead of benefiting domestic consumers, FRA subsidies to millers have therefore mainly benefitted millers and traders who export maize meal to the region at very high prices.

In general, countries requiring grain from Zambia are denied this opportunity because the country must secure its own food security first. This scenario is not peculiar to Zambia alone - other countries in the region have also imposed import or export bans to protect their local citizens. Nevertheless, apart from South Africa and Mozambique, the benefits of an open maize border policy for both consumers and farmers is under-appreciated across the region.

5. Lessons Learnt and Recommendations

Zambia's experience in attempting to stabilise food prices through managing strategic reserves, pricing, and marketing and trade policy instruments has achieved mixed results and been greatly influenced by the political economy in the country. This section brings together the lessons learnt and recommendations/policy options that could help Zambia effectively manage its price stabilisation policy to achieve sustainable food.

5.1 Lessons Learnt

There is no question that Zambia requires a well-managed strategic grain reserve to stabilise staple food prices for the benefit of both consumers and producers. However, throughout this paper, it was apparent that there are no clear established modalities on how to trigger purchases or releases on the market by the Agency responsible for managing the stocks. Instead, there is a desire by some policymakers for the government to be the biggest market player with no clear mandate. The failure to have a clearly established price stabilisation policy causes panic and knee-jerk reactions with few winners and many losers. Below are some key lessons learnt that came out of this case study:

1. Maize remains an important staple food crop for poor households. Short-term price spikes arising from poor implementation of government policy have severe consumption and food security consequences among the poor households, whom the government aims to protect in the first instance.
2. Staple food price stabilising policies tend to be implemented in ad hoc, stop-go, and unpredictable ways that generate uncertainty for participants in the maize marketing system and create unintended consequences for the performance of food markets. Government officials involved in these policy measures do not realise that these policies are *ad hoc*; after all, they respond to perceived needs to influence the market to protect consumers and/or farmers.
3. Increased market participation of the FRA has resulted in raising maize prices above the market. However, this market intervention has been regressive as it disproportionately benefits the relatively better-off households while having negative effects on extremely poor households who spend close to half their food budget on staples.
4. Unpredictable implementation of government interventions in the maize market has led to reduced private sector participation. This has reinforced government's perception that markets do not function effectively, hence the call for continued and even more proactive government involvement in maize marketing.
5. Informal grain markets tend to become very thin in the hunger season (November through March) after the majority of smallholders' surplus production has been bought up and fed into formal marketing channels. Once in the hands of formal sector marketing agents, grain rarely gets back into informal channels.
6. The government's consumer subsidy through selling subsidised maize to millers is very ineffective and does not lower retail maize meal prices.

5.2 Alternative Policy Options and Recommendations

Zambia has great potential to become a regional bread basket, but to achieve this status, fundamental policy challenges facing the staple food market must be addressed. Several policy actions offer potential win/win options for balancing the food price dilemma. These policy options and recommendations are discussed below.

Fostering Private Sector Market Development

As an initial step towards an effective stabilisation policy, the government should review the country's strategic grain reserve requirement and procurement modalities, and put in place clear trigger mechanisms for FRA grain purchases and releases. To be sustainable, the government should provide clarity on the role and operational modalities of the FRA in the maize market to stimulate more private sector involvement.

To allay private sector concerns about FRA's involvement into the future, the government should revert to the original FRA mandate as set in the 1996 FRA Act of maintaining strategic grain reserves for the country and confining the Agency's procurement activities in outlying areas of the country where the private sector finds it difficult to operate. The infrastructure to procure and import grain have improved over the years and there is need for the FRA to explore cheaper alternatives compared to physically holding all strategic reserves for at least eight months.

Substitution Among Food Staples

Consumption diversification provides a key to helping vulnerable households deal with food price shocks. Nevertheless, the agriculture policy in Zambia remains maize centric, ignoring the fact that poor households would be served best if production and consumption of a wide range of foods is promoted. Although, maize remains a popular staple among the poor and vulnerable households, they also consume a wide range of food staples including sorghum, millet, cassava and sweet potatoes. These crops are drought tolerant and could be deliberately promoted as substitutes for maize. Unfortunately, these foods have often not featured in food security discussions. Dorosh *et al* (2007) reported that neglecting the substitution effects of these crops leads government and food aid agencies to overstate emergency food requirements.

Hastening the Operation of ZAMACE

Zambia has made tremendous steps towards having a private sector-led commodity exchange by passing the Credits Act of 2010 and putting in place a statutory instrument empowering ZAMACE to oversee the setting up of the warehouse receipt system. With ZAMACE linked to the Johannesburg Stock Exchange/South Africa Futures Exchange (JSE/SAFEX), the market opportunities for Zambia's grain commodities is huge. However, to sustain a local commodity exchange, large traded volumes are needed.

Given that FRA is one of the biggest market players, the government could make a deliberate decision to help capitalise ZAMACE by purchasing SGR requirements through the exchange and have the grains secured in certified private silos/warehouses. The government could be issued with warehouse receipts specifying quantity, quality and location, and these receipts could be traded on the exchange if need be. This could ensure the high volumes required to make the ZAMACE sustainable.

In addition, the cost of running the current strategic reserve system could be reduced. These savings could be used to upgrade the silo infrastructure in the country or for other social welfare programmes. The government could then give long term lease agreement to the highest bidders as long as these structures are used as certified grain storage for the benefit of farmers and traders.

Making Maize Available in Informal Market

In deficit years, the government should reconsider its strategy of releasing large quantities of subsidised maize through large scale millers alone. It would be prudent to release some of these stocks to the smaller local traders in provincial and district markets, small-scale millers and hammer mills, and even small direct sales to consumers. Disposing grain to the informal markets would relieve some of the food price pressure on low-income consumers. The private sector would be responsible for the buying, transportation and storage activities at a fraction of the current costs incurred by FRA. The savings could be redirected to other unfunded public investments.

Moderating Price Volatility Through Trade

Finally, fostering a sustainable open border policy offers Zambia a financially inexpensive means of reducing the domestic price volatility of staple foods. If private traders have no restrictions to import or export maize when market conditions permit, then the import parity price would become the upper price bound, while export parity sets a floor below which prices will not fall. If this is allowed to work without frequent government interventions, people will begin to appreciate the important role that trade can play in stabilising staple food prices. Ad hoc export or import bans in a small market, such as Zambia, results in significant price volatility. Eliminating uncertainties over government interventions, especially FRA trade volumes and import and export regulations, would attract more investment into the maize sector value chain including production, transportation, storage and processing. If the process is transparently managed, it will bring about price stability, which benefits both consumers and producers, at very low cost to the treasury.

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