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FOOD SECURITY RESEARCH PROJECT

ASSESSMENT OF ALTERNATIVE MAIZE TRADE AND MARKET POLICY INTERVENTIONS IN ZAMBIA

By

Jones Govereh, T.S. Jayne and A. Chapoto

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EXECUTIVE SUMMARY

Introduction: The economic reforms in maize marketing and trade policies implemented during the 1990s have been highly controversial, and there remains a lack of solid empirical investigation on the impacts of these reforms on national food security, price stability and rural income growth. This study aims to provide a detailed evidence-based analysis of the impacts of maize marketing and trade policies on smallholder agricultural production growth, access to food by consumers, and other important national policy objectives. These insights from Zambia can hopefully move forward the continuing debate in the region on how maize marketing and trade policies should be structured in the future.

Data: The study relies on the combination of nationally representative rural household survey data, maize price information, and interviews of key stakeholders at various levels of the maize marketing chain as well as government officials. Estimates of annual maize production in Zambia is available from two sources. The first is the nationally representative Post-Harvest Surveys (PHS). The PHS is conducted annually by the Central Statistical Office (CSO) of the Government of the Republic of Zambia (GRZ). The other source of annual maize production estimates is the Crop Forecast Survey (CFS). The CFS is conducted annually by the Ministry of Agriculture and Cooperatives and this data is also the basis for trend analysis in aggregate agricultural production indices compiled by the FAO. Data from two nationally-representative surveys conducted in 2001 and 2004 by FSRP provided a comprehensive assessment of smallholder conditions in Zambia. Data on maize grain and maize meal imports and exports in Southern and Eastern Africa were obtained from the online Food and Agriculture Organization Agriculture Statistics (FAOSTAT).

Methods: The study adopts a structure-behavior-performance framework. We first provide a chronology of maize marketing and trade policy decisions from the early 1990s to 2007, and the rationale behind them, and trace their effects over time. The study also employs econometric analysis of monthly price data to examine changes in maize prices and marketing margins over time.

Findings: Fifteen years after the initiation of agricultural reform programs in Zambia, maize marketing and trade policies are again fundamentally similar to the controlled marketing systems of their earlier histories. The Chiluba government deregulated maize prices and private trade in the early 1990s but retained a limited government role in the market and frequently arranged maize imports to ensure adequate food supplies during drought years. However, the Mwanawasa government, starting in the early 2000s, has substantially increased the role of the Food Reserve Agency. In 2006 and 2007, the FRA has bought at least half of the marketed maize surplus produced by smallholder farmers at prices well above market levels. The government has tightened its control over the issuance of import and export permits, such that, in addition to the FRA, only a few selected traders and millers able to get permits from government are allowed to legally engage in cross-border trade. Within this policy environment, there is limited scope for additional private investment, especially in the more remote smallholder areas where the FRA's pan-territorial and above-market pricing structure makes it difficult for traders to operate profitably. Limited private trade in these areas contributes to policy makers' perceptions that markets do not function effectively, which reinforce calls for continued and even more proactive government involvement in maize marketing.

Directly after the partial withdrawal of government maize production subsidies and pan-territorial pricing in the early 1990s, maize area and production declined, as did fertilizer use. These developments in the maize sector were the focus of great attention by policy makers and analysts. Less noticed was the substitution effects in production and consumption that occurred as a result of the reforms, leading to relatively high production growth rates for crops such as cassava, groundnuts, sweet potatoes, cotton, tobacco, and animal products. Horticultural crops also appear to have become very important sources of income for smallholders especially in the northern regions of Zambia. Overall, agricultural growth rates between 1990 and 2006 have averaged 2.0%. This is clearly insufficient to generate rapid rural income growth and poverty reduction, though poverty rates have declined steadily since the early 1990s.

One clearly positive outcome of market liberalization has been a decline in the marketing margins between wholesale maize prices and retail maize meal prices. This significant decline in real maize meal prices over the 1994-2007 period is due to rapid investment and increased competition in the maize milling industry. This has clearly helped urban consumers and rural farm households that are buyers of maize meal. Yet over half of Zambia's rural population remains below the poverty line. Government's decision in the past 2-3 years to engage more aggressively in maize marketing and trade reflects a view that something different is needed to kick-start agricultural growth and rural development.

Although maize price stabilization policies could potentially have important benefits for low-income consumers, these benefits do not appear to have been successfully achieved by the existing mix of import tariffs, sporadic export bans, and marketing board operations to influence producer and consumer prices. Maize price instability in Zambia is extremely high in spite of persistent government operations to stabilize prices. While it is analytically difficult to estimate the counterfactual – i.e., the level and instability of maize prices that would have prevailed over the past 15 years in the absence of these government operations – there are strong indications that at least some aspects of government interventions in the market have exacerbated rather than reduced price instability for both producers and consumers.

Policy Implications: Regarding the future directions for maize policy, the study assesses the relative merits of alternative policy interventions that may be required to improve maize sector performance and national food security. The clearest priority is for the Government to adopt a more consultative mode of coordination with the private sector and to move toward a more "rules based" approach to the use of domestic and trade policy tools, based on the recognition that the private and public sectors are part of an integrated system and that coordination between them is necessary to avoid food crises during times of national production shortfalls. Greater transparency with regard to the setting of FRA purchase and sale prices, import and export decisions, and stock release triggers could be considered. Government could also consider clarifying whether and how the non-operational public silos are to be sold off or transferred to private firms under a comprehensive restructuring process.

On regional trade, it is likely that streamlining border and custom clearing processes and removing controls on the issuing of import and export permits would promote the interests of both producers and consumers over the long run.

Finally, government has a major role to play in making sustained and prioritized investments in crop science, effective extension programs, irrigation and physical infrastructure. Many agricultural market failure problems in Africa reflect an under-provision of public goods

investments to drive down the costs of marketing and contracting. Getting markets to function effectively is likely to require increased commitment to investing in public goods (e.g., road, rail and port infrastructure, R&D, agricultural extension systems, market information systems) and institutional change to promote the functioning of market-oriented trading systems. Unfortunately the large share of government expenditures devoted to food and input marketing operations represents a high opportunity cost in terms of foregone public goods investments to promote the functioning of viable food markets and foregone private investment that is crowded out by government operations.

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ACRONMYS

ACP	African Caribbean & Pacific
AFC	Agricultural Consultative Forum
AIM	Agricultural Inputs Development Plan
AMDP	Agricultural Market Development Plan
AMIC	Agricultural Market Information Centre
ASIP	Agricultural Sector investment Program
CFS	Crop Forecast Survey
CIF	Cost of Insurance and Freight
COMESA	Common Market for Eastern and Southern Africa
CSO	Central Statistical Office
CUSA	Credit Union Savings Association
DRC	Democratic Republic of Congo
FAOSTAT	Food and Agriculture Organization Agriculture Statistics
FRA	Food Reserve Agency
FSRP	Food Security Research Project
GRZ	Government of the Republic of Zambia
GTAZ	Grain Traders Association of Zambia
HIPC	Highly Indebted Poor Countries
IOPV	improved open-pollinating varieties
LIMA Bank	Learning Improved Methods of Agriculture Bank
MACO	Ministry of Agriculture and Cooperatives
MAZ	Millers Association of Zambia
MFNP	Ministry of Finance and National Planning
MSU	Michigan State University
mt	Metric Tons
NAMBOARD	National Agricultural Marketing Board
NCZ	Nitrogen Chemicals of Zambia
PHS	Post Harvest Survey
R&D	Research and Development
SADC	Southern African Development Community
SS	Supplementary Surveys
UNIP	United National Independence Party
USAID	United States Agency for International Development
VAT	value added tax
WFP	World Food Programme
WTO	World Trade Organization
ZCF	Zambian Cooperative Federation
ZNFU	Zambia National Farmers' Union
ZRA	Zambia Revenue Authority

1. INTRODUCTION

Over the past several decades, the role of markets and trade in supporting national food security, price stability, and rural income growth has become widely recognized. However, there are widely different views as to how marketing and trade policies should be structured to best achieve these objectives. In the 1970s and 1980s, it appeared that much of eastern and southern Africa was on the verge of a green revolution. During this time, state-controlled marketing systems integrated input credit, input delivery, and output marketing. Smallholder farmers were rapidly increasing their use of hybrid maize seed and fertilizer. Maize yields were rising impressively in countries such as Zimbabwe, Zambia, Kenya, and Malawi. Most of these countries were largely food self-sufficient, and some were producing reliable exports to feed the region.

However, these promising maize production trends were short-lived. Structural adjustment and market liberalization policies, largely viewed as being imposed on African governments by donors and international lending organizations, coincided with a gradual erosion of maize surpluses and self-sufficiency in most of these countries during the 1990s. The withdrawal of state-led credit and input subsidies and marketing board operations led to a decline in maize area and yields, at least in the relatively remote areas where a large proportion of smallholder farmers resided. Maize production has largely stagnated in all of these countries since the early 1990s to date. This might give the impression that smallholder agriculture and livelihoods have stagnated over the past 15 years during this era of market liberalization. However, as argued in later sections of this study, the story is considerably more complex and nuanced. In many ways, market and trade reform, to the extent that it was implemented, has benefited smallholder farmers and urban consumers in important respects, despite other adverse trends and shocks affecting the region. While maize production in Zambia has stagnated, there has been impressive production growth of other crops. Rural poverty rates have declined consistently since the early 1990s. Real prices of maize meal and maize marketing margins have also declined dramatically in the post-liberalization era. Our analysis argues that simple comparisons of maize production trends before and after ostensible liberalization tend to generate unfounded conclusions and misleading implications for future marketing and trade policy.

Maize is the dominant staple food in Zambia. It accounts for 25-30% of the gross value of smallholder crop output in Zambia and roughly 40% of the country's calorie intake (Zulu et al. 2006). Maize marketing and trade policy has in recent years been the subject of intense debate, both throughout Sub-Saharan Africa in general, and Zambia in particular. This study is motivated by the potential to learn from Zambia's experience with maize marketing and trade policies, in order to guide discussions of future policy options. The study's objectives are to examine the effects of historical policies on smallholder farm productivity and incomes, food price stability, and consumer food security, and to analyze possible alternative policy options and their anticipated impacts.

Section 2 describes the data used in this analysis. Section 3 traces the evolution of maize marketing and trade policies in Zambia since 1990. Section 4 evaluates the impacts of these policies, their achievements and weaknesses. Section 5 considers a number of alternative policy options and the likely changes in performance and distributional effects that they would bring. A major issue explored in this section is the identification of government interventions capable of cost-effectively promoting smallholder productivity and income growth. Section 6 summarizes the major issues for future research and policy.

2. DATA

There are two sources of annual crop production estimates in Zambia. The first is the nationally representative Post-Harvest Surveys (PHS). The PHS is conducted annually by the Central Statistical Office (CSO) of the Government of the Republic of Zambia (GRZ). These surveys began in the 1970s and were called the Agricultural and Pastoral Production Surveys at that time. Later on, the survey encompassed the crop forecasting stage of the season and was renamed the "Early Warning and Agricultural Survey" (Nyasulu 2006). In 1985/86, the main survey was split into two, namely, the Crop Forecast Survey (CFS) and the Post Harvest Survey. The CSO agricultural surveys cover a consistent set of crops annually and are the only statistically-based source of smallholder production and marketing behavior in Zambia (Zulu et al. 2000). The CSO surveys are based on a sample frame of about 8,000 small-scale (0.1 – 5.0 hectares) and medium-scale farm households, defined as those cultivating areas between 5 to 20 hectares. About 86% of the farms in this nationally-representative survey are in the small-scale (0.1 to 5.0 hectare) category. For shorthand, we refer to the full sample of both categories as the "smallholder" sector. The surveys also cover large-scale farms (defined as farms planting 20 hectares or more). CSO's design for large-scale surveys is to enumerate 100% of the farmers by mailing production surveys to farmers. However, response rates are reputed to be low and CSO has not been able to keep pace with the growing frame of large-scale farmers. Thus it is unclear how CSO is able to produce estimates for large-scale farm output.

The other source of annual crop production estimates is the Crop Forecast Survey. Between 1985 and 1991, there were two parallel CFSs, one conducted by CSO and another conducted by the Ministry of Agriculture and Cooperatives. CSO surveys have always been statistically based. But the Ministry of Agriculture CFS was based on local extension worker estimates of cultivation patterns in their camps, which were then aggregated up to the national level. The MACO CFS is considered an unreliable indicator of smallholder production trends because the estimates are based on impressions of national extension workers rather than statistically valid surveys of farm smallholder households like the PHS. Since 1991, there has been only one CFS as the Ministry of Agriculture abandoned its CFS and embraced CSO's CFS. For both CFS and PHS, the CSO uses a similar design to cover both smallholder and large-scale farmers. The problems CSO faces in covering large-scale farmers in PHS are also experienced in CFS.

CSO agricultural surveys in their current form are based on a set of agricultural enterprises that were dominant in the 1970s, which may not match well with smallholder production patterns in the 1990s and 2000s. Because of important enterprise shifts over time and the lack of coverage of certain crops in earlier periods that are known to be important now, it is potentially misleading to examine trends in the total value of agricultural output from the 1970s to the present time based on the set of crops that were found to be most important in the 1970s. For this reason, it is not possible to use CSO surveys to compare pre-liberalization vs. post-liberalization agricultural performance. Enterprises that are known to have increased dramatically in smallholder production patterns in recent years, such as fresh fruits, vegetables, and animal products are not covered adequately in CSO surveys. Evidence compiled in related nationally-representative surveys using the same sample frame as the PHS find, for example, that in 2002/03, the value of horticultural and animal product sales were each almost as high as the value of maize sales by the smallholder sector (Zulu et al. 2006). It is important to keep these data limitations in mind when trying to understand performance in the sector over time.

Additionally, CSO agricultural surveys are prone to underestimating national crop production because of difficulties associated with listing all farm households in selected sampling areas, a procedure that is necessary to compute accurate "weighting factors" for deriving statistically valid national production estimates from the surveyed households. The government censuses of 1990 and 2000 show that the number of rural agricultural households has grown by 80% over this ten year period, a trend that is not reflected in CSO weighting factors.

We also draw on FAO Stat data (http://faostat.fao.org/site/601/default.aspx) for trends in aggregate agricultural production indices.

Lastly, we report data from two recent nationally-representative surveys conducted by the Central Statistics Office, with support from the Food Security Research Project in 2001 and 2004 to provide a comprehensive assessment of smallholder conditions in Zambia. These Supplementary Surveys (SS) covered the 1999/00 and 2002/03 cropping seasons and the 00/01 and 03/04 marketing seasons, and were designed to provide a holistic picture of smallholder circumstances that links together information on crop production, sale and purchase patterns, household income, and other characteristics. Unlike the PHS, the SS surveys cover the full range of crops and animal products grown by Zambian smallholders, as well as off-farm income activities.[1]

Monthly wholesale maize grain and retail breakfast meal price information between January 1994 and October 2005 was drawn from the Agricultural Market Information Centre (AMIC) in Zambia. Data on maize grain and maize meal imports and exports in southern and eastern Africa were obtained from the online Food and Agriculture Organization Agriculture Statistics (FAOSTAT).

[1] Off-farm income includes all cash or value of goods earned from working outside one's farm, including labor income from working on another farm or non-farm business. It covers casual labor, wage labor, formal employment, pension income, off-farm business activities, and remittances.

3. HISTORICAL EVOLUTION OF MAIZE MARKETING AND TRADE POLICIES

3.1. The 1960-1990 Period

Current food policy issues in Zambia, as in much of eastern and southern Africa, are rooted in an historical context. Understanding the political and economic pressures propelling food policy in the region requires an understanding of the role of maize as the strategic political crop in this region of Africa. Maize became the cornerstone of an implicit and sometimes explicit "social contract" that the post-independence governments made with the African majority to redress the neglect of smallholder agriculture during the former colonial period (Jayne and Jones 1997).

Starting at Independence in the mid 1960s, a prominent goal of government policy was to promote smallholder welfare, using maize production incentives as the main vehicle. This goal was achieved with great success in the 1970s and 1980s (Howard and Mungoma 1996). Two main ingredients drove this production growth: (i) input and crop marketing policies, broadly defined; and (ii) improved seed breakthroughs. The key features of the marketing policies were (a) expansion of state crop buying stations in smallholder areas; (b) direct state control over grain supplies and pricing; (c) developing a system of cooperatives to link farmers to the services provided by the marketing boards; (d) heavy subsidization of fertilizer to encourage its use by small farmers; (e) efforts to stabilize and subsidize urban consumer prices without reliance on imports; and (f) shifting the massive costs of these government investments and subsidies onto the Treasury. Following independence in 1964, United National Independence Party (UNIP) government expanded the promotion of maize production by instituting a nationwide pan-territorial pricing policy, fertilizer subsidies, and investment in government-led maize buying stations. The state invested heavily in crop-buying depots, first through the National Agricultural Marketing Board (NAMBOARD) and later through the Zambian Cooperative Federation (ZCF) and its member societies. The intent of the subsidies was to guarantee marketing services to smallholders throughout the country. A large proportion of the subsidies was used to compensate the marketing board and cooperative societies for their financial losses. Some of these losses occurred because NAMBOARD and the cooperatives were forced to provide marketing services to remote areas at pan territorial prices and so could not recover their transportation and handling costs. Also, most of the losses were a direct result of poor management in NAMBOARD and the cooperatives. Subsidies rose eightfold in 10 years, from ZK 4 million in 1965 to ZK 34 million in 1974 (Nakaponda 1992; Muyatwa-Sipula 1993). Nevertheless, the expansion of state market infrastructure in smallholder areas combined with massive expenditures devoted to fertilizer subsidies fueled an impressive increase in maize production over the 1970s and 1980s.

Improved maize seed varieties were the other central aspect of the maize production increase (Byerlee and Eicher 1997). Maize yields rose dramatically between 1960 and 1980 (Howard 1994). The germplasm produced by the Zambian maize program from the mid-1970s through the early 1990s included an impressive array of ten double and three-way crosses, and two flint-type, early-maturing, improved open-pollinating varieties (IOPV) (Howard 1994). In all but the most difficult growing environments, the hybrids out yielded local (and improved) open-pollinated varieties even without fertilizer. But the improved maize varieties also raised the returns to fertilizer use, and clearly the seed, fertilizer, and crop marketing investments were highly synergistic. Unlike the single cross SR52, the new hybrids were double and three-way crosses, so their yield advantages lost with recycling were

not so great. Achieving these advances depended on access to both international breeding expertise and international germplasm collections and decades of sustained investment (Smale and Jayne 2003).

During this period of the 1970s and 1980s and up to the early 1990s, smallholder production patterns appear to have been dominated by maize. Maize accounted for 76% of the total value of smallholder crop production, based on the sub-set of crops covered in the new PHS surveys fielded in 1990/91. Cassava's share of total smallholder crop income was 10%, while all other crops combined were 14%.

While the post-independence model of service provision for smallholder maize production appears to have had important successes in boosting rural incomes in some rural areas, by the mid-1980s major problems had emerged that propelled the input and crop marketing systems toward reform. First, marketing board costs escalated as the scale and complexity of their activities increased. Losses consisted of two types: those which government forced on the board by mandating it to carry out activities that were unprofitable but fulfilled "social" functions like buying maize at above-market prices in remote areas (which encouraged maize production expansion), and those related to operational inefficiency (which probably had little effect on smallholder maize production). Pan-territorial pricing was particularly burdensome in Zambia, since it raised the share of grain delivered to the boards by smallholders in remote (but often agronomically high-potential) areas where transport costs were high. Stockpiling white maize, a consequence of government preoccupation with maize self-sufficiency, was also costly (Howard and Mungoma 1996). Operational inefficiency and allegations of corruption were widespread. The treasury costs of state fertilizer and maize marketing operations were so large that they contributed to macroeconomic instability and hyperinflation (Jansen and Muir 1994). Zambia's National Agricultural Marketing Board's operating losses were roughly 17% of total government budgets in the late 1980s (Howard and Mungoma 1996).

Howard (1994) provides a detailed analysis of the rate of return to the maize seed research and marketing policies of the 1970s and 1980s in Zambia. Her analysis explicitly includes the costs of a full range of investments leading to hybrid maize adoption by smallholder farmers. Marketing costs accounted for roughly 59% of the total costs of all investments, in contrast to the seed research investments, which were only 3% of the total. Extension and other service provision programs accounted for the remaining 38%. The rate of return on maize research was favorable when the costs of marketing were not included. After including the costs of all related investments (research, extension, seed and marketing), however, the average rate of return to maize research in Zambia was negative over the 1987-91 period.

The maize "market liberalization" period started around 1990 in Zambia. However, there are two distinct sub-periods: the 1990-2004 period, where government involvement in the maize market was curtailed, and the 2005-2007 period, which increasingly resembles the state-led maize self-sufficiency policies of the 1980s. These two periods are described below.

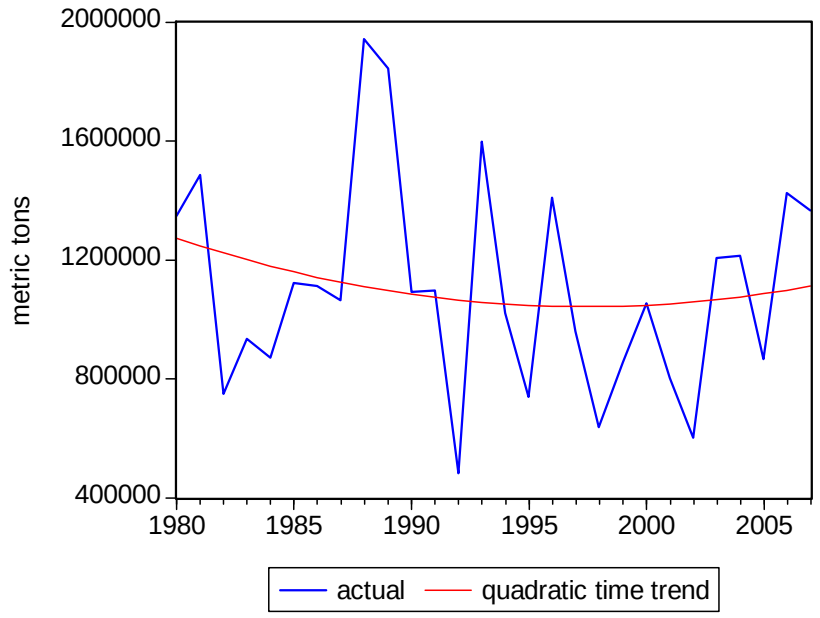
3.2. The Period 1990 - 2004

Fiscal crises and increased donor leverage over policy pushed the grain marketing systems of eastern and southern Africa toward liberalization in the mid-1980s. Largely because of the financial unsustainability of its massive input, credit, output market and maize meal price

subsidies, and a slump in its copper revenues, the Zambian government became increasingly dependent on external lenders, thereby losing some degree of control over its agricultural policies. The early 1990s brought much tighter fiscal constraints on government social activities, and led to the infamous "structural adjustment" and market reform policies designed to reign in state spending on agriculture to a level that could be sustained given its revenue base.

Dissatisfaction with market reform has also been exacerbated by its association with a retreat from the "social contract" marketing investments in support of smallholder welfare. The first ten years of the post-1990 period have been associated with a decline in *absolute* maize production in Zambia (Figure 1). However, by the early 2000s, donors relaxed the condition that loans to government be linked to specific policy changes, based on the experience that "buying" reform was an ineffective way to secure government commitment and ownership of policy change. In fact, throughout the liberalization process, the Zambian government has remained a major player in both the maize and fertilizer markets, and continues to exert great influence over private trade decisions through import tariffs, export bans, marketing board operations, and input subsidies. For example, the government established in 1996 the Food Reserve Agency (FRA). 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 liberalization while the private sector was establishing itself. Between 1996 and 2002, the government assigned the FRA to administer a fertilizer credit program to farmers. However, credit repayments were dismally low, around 10% (Smith et al. 2001), leaving FRA in debt and unable to achieve its stated goals. After coming to light that many businesses belonging to members of Parliament were in arrears to the FRA, its role in fertilizer distribution was transferred to a different government program.[2] The FRA

Figure 1. Maize Production Estimates, 1980 to 2007 Harvest Years



Source: GRZ, Crop Forecast Surveys, Ministry of Agriculture & Cooperatives, Central Statistical Office.

[2] Politicians' financial interest in government fertilizer distribution surfaced publicly in a front page article in the country's main newspaper: Members of Parliament 'Shrink' Over FRA Debts Debate. *The Zambia Times,* November 11, 2000.

operations shifted after 2002 to maize marketing and its role in maize trading has grown considerably. Although FRA's original mandate did not include a price support function, the agency was instructed to purchase maize at pan-territorial prices fixed by government, including in remote areas where maize production for the market is unlikely to be profitable under commercial conditions.

In 2006, FRA purchased 386,447 tons of grain from smallholder farmers at a price of 744,000 kwacha (roughly US$190) per ton, which is estimated to be over 80% of the national marketed maize output from the smallholder sector (Table 1). The government has also remained involved in arranging maize imports, subsidizing the price at which it offers maize imports to large millers (Nijhoff et al. 2002; Mwanaumo et al. 2005). After accounting for FRA activities, government maize imports, discretionary import tariff rates, and export bans,[3] the government clearly controlled most of the marketed maize output in the country.

Nevertheless, the subsidies devoted to maize production since the mid 1990s are substantially smaller in real value terms than public sector subsidy outlays in the 1980s. The overall reduction in subsidy support for maize production has caused important shifts in cropping patterns over time. Over the 12-year period between the 1991 and 2003 harvests, the share of maize in total smallholder crop output declined from 76% to 55%. Cassava rose from 10% to 26%, largely replacing maize in areas of northern Zambia where it had been grown prior to the introduction of the maize marketing and fertilizer subsidies (which favored maize production). Seed cotton's production share has risen from 3% to 8%. Smallholders' sale of animal products and fresh fruits and vegetables also appear to have risen substantially.

There have been noticeable differences in crop production growth rates (Table 2). The worst performance has been registered for the staple grains and beans, while impressive production growth has been achieved for cassava, sweet potatoes, cotton, and groundnuts.

The well-documented decline in maize production has been driven largely by policy. During the 1992 to 2004 period, government support for maize production was reduced, but not withdrawn, as government treasury outlays for the purchase of maize were reduced, maize meal subsidies were eliminated, and massive fertilizer subsidy programs were scaled-back. Maize production in the more remote regions of northern Zambia declined substantially as area formerly under maize was shifted to roots, tubers, and groundnuts.[4] Cassava, sweet potato, and groundnut productivity have all benefited from the introduction of improved varieties in the early- to mid-1990s. Cotton has also made big inroads; by 2003/04, one out of every five small farms grew cotton, thanks to substantial private investment in smallholder outgrower arrangements. Horticultural crops and animal products (while unmeasured in the PHS surveys) also appear to be growing rapidly.

[3] Strictly speaking, export bans are not official government policy. However, a private firm seeking to export maize must first acquire an export permit from government. By restricting the issuance of export permits, as it has since 2005, the government effectively bans official private export of maize except for the few firms that are able to secure permits.

[4] Some analysts contend that the increasing role of cassava, a drought tolerant crop that can be stored in the ground, provides new potential to stabilize food consumption in the face of maize production shortfalls (Haggblade 2006). The availability of a drought-tolerant crop that is less prone than maize to extreme production fluctuations provides some relief in the degree to which maize supplies can fluctuate from year to year without seriously aggravating food insecurity.

Table 1. Small and Medium-scale Maize Output, FRA Purchases and Purchases as % of Production

Harvest year	Marketing year	Smallholder Maize Production (tons) PHS	Smallholder Maize Production (tons) CFS*	Smallholder Maize Sales (tons) (c)	FRA domestic purchases (tons) (d)	FRA/Govt net maize imports (tons) (e)	Govt domestic purchases as % of marketed surplus from smallholder sector (f)=(d)/(c)
1991	1991/92	1,227,627	1,097,000	607,961		85,400	
1992	1992/93	387,556	483,492	215,698		575,000	
1993	1993/94	926,508	1,597,768	641,922		400	
1994	1994/95	699,888	1,020,750	362,780		10,000	
1995	1995/96	575,288	737,836	264,724		108,000	
1996	1996/97	1,032,878	1,409,487	276,773	10,500	109,000	3.8%
1997	1997/98	756,560	960,189	184,976	5,000	70,000	2.7%
1998	1998/99	623,131	638,135	157,177	0	150,000	0
1999	1999/00	790,000	855,870	217,391	0	0	0
2000	2000/01	846,172	1,052,806	272,004	0	0	0
2001	2001/02	661,315	801,877	197,915	0	150,103	0
2002	2002/03	654,140	601606	195,407	23,452	41,608	12.0%
2003	2003/04	850,871	1,207,201	291,462	54,850	0	18.8%
2004	2004/05	1,050,535	1,213,601	356,750	105,300	-22,098	29.5%
2005	2005/06	729,000	866,186	289,000	120,000	36,245	41.5%
2006	2006/07		1,424,438	426,000**	386,449	-230,000	90.7%

Source: GRZ, Crop Forecast Survey estimates, MACO; modified Post Harvest surveys, Central Statistical Office. FRA data files.
*CFS estimates include large-scale maize production. **preliminary estimate.

Table 2. Growth Rates (% per annum) for Selected Crops Produced by Smallholder Farmers, Zambia , 1991 – 2004

Crop	Area	Yield	Production	Sales
Maize	0.2	0.5	0.6	-1.8
Sorghum	-0.3	0.7	0.4	2.4
Millet	0.0	0.5	0.6	1.9
Cassava	1.6	1.7	3.3	5.2
Groundnuts	0.9	3.0	4.0	3.9
Cotton	3.6	1.7	5.3	5.4
Soybean	2.9	1.8	4.8	3.5
Sunflower	-0.5	1.4	0.9	-1.5
Sweet potatoes	4.6	2.0	6.6	6.6
Mixed beans	1.8	-1.3	0.6	1.0

Source: Govereh et al., 2006, computed from raw PHS data, Central Statistical Office, Lusaka.

Nationally-representative survey evidence from 2002/03 indicates that 45% and 17% of smallholder households derive income from the sale of animal products and horticultural products, respectively (Table 3). The value of smallholder sales of animal products and horticultural products are each almost as high as that for maize. Major production growth is being achieved in other unregulated crops as well, notably groundnut, soybeans, and tobacco (Govereh et al. 2006).

Zambia's agricultural liberalization period from 1990 to 2004 thus presents a picture of declining maize production and rising production of many other crops. What has been the overall net impact on smallholder agriculture? Figure 2 presents post-1990 trends in inflation-adjusted value of total agricultural production from the smallholder sector, based on the Post Harvest Surveys. The total gross value of agricultural output stagnated for the first half of the 1990s, but has risen by over 50% between the 1997/98 season and the last three seasons for which data is available (2001/02 to 2003/04). As indicated earlier, activities believed to have grown rapidly in recent years (fresh fruits, vegetables, and animal products) are not counted in a systematic way in these production statistics. The upward trend in Figure 2 is likely to underestimate the actual positive growth if these activities were included. Therefore, the overall picture indicates that, although maize production has declined greatly from former levels in the 1980s, to a large extent this decline reflects a shifting of land and labor into other crops, most notably cassava, cotton, groundnut, and probably horticulture and animal products as well.

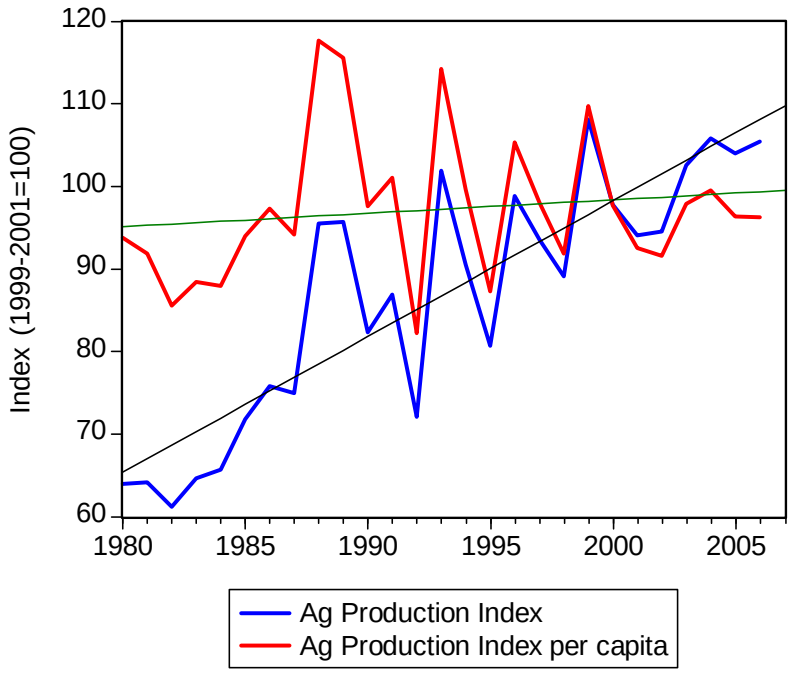
Table 3. Farm Production Patterns of Small- and Medium-Scale Agricultural Households in Zambia

Farm Enterprise	Marketing Year	% farmers producing	Total production (Tons)	Gross Value of Production (000 US$)	% farmers selling	Total sales (Tons)	Gross Value of Sales (000 US$)	Sales as % of production – mean across households	Sales as % of production – national	% of gross farm sales revenue - national	Consumed on farm (Tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Maize	2000/2001	77.9	1,260,123	102,531	25.5	272,950	23,647	12.2	23.1	10.3	987,173
	2003/2004	79.9	1,365,103	140,575	28.4	370,332	38,955	13.5	27.7	10.2	994,771
Sorghum	2000/2001	12.4	41,976	4,653	1.9	3,614	398	6.1	8.6	.2	38,363
	2003/2004	10.3	40,887	4,574	2.0	5,378	602	7.7	13.2	.2	35,509
Sweet potato	2000/2001	27.6	178,863	8,466	9.8	37,869	1,711	18.4	20.2	.7	140,994
	2003/2004	18.8	138,227	5,127	7.7	51,581	1,918	24.6	37.4	.5	86,646
Cassava	2000/2001	37.7	794,824	19,383	12.7	87,776	2,117	10.6	10.9	.9	707,049
	2003/2004	38.8	836,057	50,905	11.1	70,491	4,339	9.2	8.5	1.1	765,566
Cotton	2000/2001	5.7	43,359	10,491	5.5	41,938	10,147	96.6	96.7	4.4	1,421
	2003/2004	10.5	123,085	31,259	10.3	118,461	30,087	96.5	96.2	7.9	4,624
Tobacco	2000/2001	1.1	5,679	3,735	1.1	5,263	3,466	94.3	92.8	1.5	416
	2003/2004	1.4	13,005	11,725	1.4	12,678	11,418	97.8	97.4	3.0	327
Beans and legumes	2000/2001	13.0	27,297	7,735	6.7	10,782	3,088	29.7	39.9	1.4	16,516
	2003/2004	17.2	35,460	9,423	9.5	15,704	4,177	30.3	44.3	1.1	19,756
Groundnuts	2000/2001	35.8	56,586	17,089	13.8	14,672	4,475	19.2	26.2	2.0	41,914
	2003/2004	42.1	89,100	26,871	20.1	24,409	7,345	23.0	27.3	1.9	64,691
Vegetables and Fruits	2000/2001	---	---	---	20.8	---	25,699	---	---	11.2	---
	2003/2004	---	---	---	16.3	---	35,427	---	---	9.3	---
Livestock products	2000/2001	---	---	---	32.3	---	13,058	---	---	5.7	---
	2003/2004	---	---	---	44.5	---	33,206	---	---	8.7	---

Source: Supplemental Survey to the 1999/2000 Post Harvest Survey, Central Statistical Office, 2000/2001 & 2003/2004 Marketing Season, reported in Zulu, Jayne, and Beaver 2006.

Notes: 2000/2001 marketing year refers to 1st May 2000 to 30th April 2001; 2003/2004 marketing year refers to 1st May 2003 to 30th April 2004. Horticultural (fruit and vegetable production was not collected but sales were. Column 9 figures are computed as the weighted mean across all households level, i.e., (sales/production)*100). Column 10 figures aggregate total weighted sales and production across all farmers, then takes the mean of this, i.e. (total sales/total production)*100.

Figure 2. Trends in Aggregate Agricultural Production, Absolute and Per-capita, 1980-2006



Source: FAO Stat. Downloadable at: http://faostat.fao.org/site/601/default.aspx

3.3. The Period since 2005

Since the amendment of the Food Reserve Act in 2005, there have been dramatic changes in Zambia's maize marketing and trade policy environment. These amendments mandated FRA to engage in maize trade. First, the government has resumed its former heavy role in maize purchasing. The Food Reserve Agency has opened over 600 buying depots in the country to buy maize from smallholder farmers at pan-territorial prices far above wholesale market prices (e.g., US$192 per ton in 2006 and US$186 in 2007). There is a widespread belief that the governments' unprecedented maize buying campaign in 2006 played a major role in the re-election of President Levy Mwanawasa in December 2006. The rationale behind the renewed government involvement in maize marketing has been to provide renewed production incentives for maize and to become self-sufficient in the primary staple food. We will examine the distributional effects of this return to a maize self-sufficiency policy later.

Zambia is a member of the World Trade Organization (WTO), African Caribbean & Pacific (ACP) countries, Common Market for Eastern and Southern Africa (COMESA) and Southern African Development Community (SADC). As a signatory to these treaties and agreements, Zambia is bound by the rights and obligations set for all trading partners in these groupings. For example, under COMESA, Zambia is obliged to offer duty free access to imports of member states.

Despite signing the regional trade treaties, the Zambian government has restricted maize trade from flourishing through several legislations. Throughout the post-liberalization period, Zambia retained control over the flow of agricultural imports and exports through the Control of Goods Act, Agriculture Regulations (GRZ 1954). The Control of Goods Act empowers the Minister of Agriculture and Co-operatives to regulate the exit and entry of all types of agricultural products and by-products subjecting them to meet Sanitary and Phytosanitary minimum requirements of Zambia and those of importing countries.

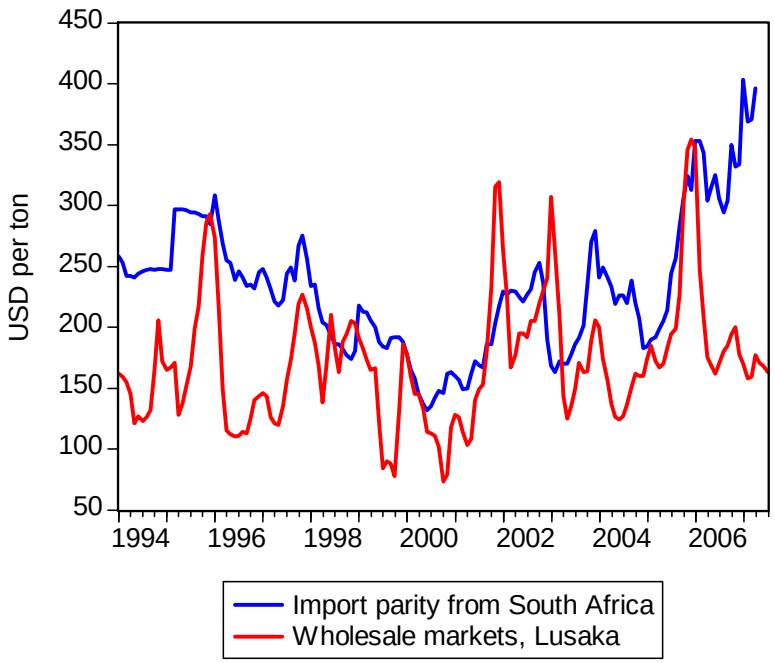
This same legislation is relied upon to restrict strategic food exports whenever the country experiences shortfalls in the production of maize. The application of this act when restricting exports is not consistent with the WTO Agreement on Agriculture. The agreement requires Zambia in this case, to notify countries importing her maize first before suspending issuance of export permits. The issuing of permits has become much tighter since 2005. The Ministry is allocating export quotas and permits to FRA and agribusiness associations on a selective basis. This change in policy is forcing individual traders to affiliate with associations in order to utilize the relevant association's permit.

Zambia also controls imports and exports through the Customs and Excise Act (GRZ 1955). Importation of agricultural produce (e.g., fresh fruits, vegetables, meat and livestock), plants and their products; grain, wheat and seed is restricted together with other products such as medicines and drugs; mineral ores and precious stones, firearms and ammunition; and pets (Zambia Revenue Authority undated). These restrictions require importation to be accompanied by the relevant licenses, permits, certificates, and other legal documents. Under the same Act, limited quantities of maize and maize meal meant for consumption are not subjected to any documentation. This is commonly known as the "one-bag rule". Traders abuse this provision by employing youth gangs to cart grain across borders one bag at a time.

Regulations under the Customs and Excise Act charge customs duty of 15% and 25% on imported maize grain and maize meal, respectively. Besides, an import value added tax (VAT) of 17.5% is also charged. Total taxes for imported maize and maize meal together add up to 35% and 47%, respectively.

The government has changed its import tariff rates on maize several times since 1994. Prior to 2004, the tariff rate was at 5% but this was raised to 15% since 2004. During critical domestic maize shortages in 2005, government waived duty for maize imports in order to cushion maize consumers from high maize meal prices. This policy environment, in which the import tariff can change suddenly, stymies private traders from importing maize when the situation would otherwise warrant doing so. If traders suspect that the import tariff will be waived later in the year, this means that if they mobilize imports early (while the tariff is in place), they are likely to lose their market later when competing against other firms that can import more cheaply once the tariff is waived. The result of this policy uncertainty is commonly a temporary under-provision of imports during periods when traders wait for the anticipated waiver of the import tariff before importing. Such policy uncertainty in the market can produce a situation in which local prices exceed import parity levels for periods of time, as it did in Zambia's case in both 2001/02 and 2005/06 (Figure 3).

Figure 3. Wholesale Maize Prices in Lusaka, Zambia and Import Parity from South Africa, January 1994 to September 2007



Source: Government of the Republic of Zambia, Agricultural Market Information Centre, Ministry of Agriculture and Cooperatives. South African prices are SAFEX, Randfontain. Transport costs are from the Zambia Road Haulers Association, Lusaka.

Zambia also regulates maize trade through the Value Added Tax (VAT) Act (GRZ 1996). VAT on maize and maize meal is a consumer expenditure tax charged on taxable maize production or processing inputs. After the application of VAT in 1995, maize grain and meal were VAT exempt. This meant that producers and processors could not claim any VAT paid through purchase of taxable inputs for maize production and processing. In 1996, maize was moved from the exempt to the zero-rated schedule. Zero-rating is pro-export. Producers and processors claim VAT on taxable inputs. The effect was to lower production costs and eventually consumer prices of maize products.

This categorization encouraged production and was meant to protect the low-income urban consumers from rising poverty levels (ZRA 2005). According to ZRA analysis, this rating favored mostly the high income groups compared to the target group because it is the former who consume more of industrial processed maize meal and also commercial farmers who purchase maize production inputs. The low income groups consume maize distributed through the informal sector which is largely outside the VAT register (ZRA 2005). In 2004, maize and maize meal were moved to the exempt schedule and this position obtains to date. Government's desire to collect VAT revenue from the maize industry diminishes her competitiveness in the regional market. VAT regulations charge 17.5% tax on all maize imports and the taxable value includes customs duty of 15%. A detailed chronology of the policy shifts between 1990 and 2007 harvest year is presented next.

3.4. Chronology of Maize Marketing and Trade Policy Changes

Table 4 presents the salient features and changes in maize marketing and trade policy changes, 1990 to 2007.

Table 4. Zambia: Chronology of Maize Marketing and Trade Policy Decisions and Implementation, 1990-2007

Harvest year (marketing year)	
prior to 1990	• Importation, distribution, and pricing of maize handled by government marketing agency, NAMBOARD. Pan-territorial and pan-seasonal maize producer prices encourage production, especially in remote areas. Government regulations prohibited private maize trade across districts. NAMBOARD maize operations and allied credit for maize inputs accounted for 15% of government budget in the late 1980s, contributing to macro-economic crisis.
1991 (1991/92)	• Economic Structural Adjustment Program initiated 1991. Donors provide balance of payments support for fertilizer importation. Private trade legalized. • NAMBOARD abolished in 1990, but fertilizer and credit marketing functions transferred to other state agencies (Nitrogen Chemicals of Zambia (NCZ), Credit Union Savings Association (CUSA), Learning Improved Methods of Agriculture Bank (LIMA Bank) and ZCF using a network of state-affiliated cooperatives).
1992 (1992/93)	• Chiluba government removes import and export restrictions and liberalizes foreign exchange market. • Maize meal subsidies reduced in late 1991. However, severe drought delays maize market reform. • Government sets floor price, into-mill and consumer price of maize. • Government appoints purchasing agents to buy maize.
1993 (1993/94)	• Government appoints rural banks and co-ops as buying agents for maize. • Government unable to maintain maize floor price. • Farmers issued promissory notes not redeemable for 6-12 months. • Late arrival of food aid from prior year disrupts maize market. • Sharply appreciating Kwacha discourages maize exports. • Escalating interest rates dampen private sector interest in buying and storing maize. • Government fertilizer distribution programs distribute to farmers with 10% initial payment, remainder to be paid at harvest. The loan repayment rates were roughly 35%. • Government lifts controls on bank interest rates: bank lending rate increases from 50% to 120%.
1995 (1995/96)	• First season where government refrains from announcing any prices. • Private sector plays dominant role in input and commodity marketing. • Nearly full regional and seasonal differentiation in maize prices. • Real maize prices begin to rise. Government imposes an export ban on maize grain and maize meal. • Maize and maize meal VAT changed from “exempt rating” to “zero-rated”. • Private sector confidence rises with consistent messages from government about non-intervention. • Government introduces marketing credit revolving fund. • Government begins leasing many storage warehouses to private traders and transporters. • Government provides no funds to traditional state lending institutions. Instead a marketing credit revolving fund established to encourage commercial bank market lending. Participation limited due to low funding from GRZ. • Formulation of the Agricultural Sector Investment Program (ASIP), a tool for implementing the government policy of maize market liberalization and market reform, 1994. • Food Reserve Agency (FRA) established, 1995, to manage the national food reserve.

Harvest year (marketing year)	
1997 (1997/98)	• Food Reserve Agency takes over maize input distribution on credit to smallholders. • Donors cease financing of fertilizer imports. • Pan-territorial pricing re-introduced for FRA-distributed fertilizer; makes private sector fertilizer uncompetitive in outlying areas. • Maize imported by government and sold to selected millers at US$160 per ton, 30% below prevailing market prices.
1999 (1999/00)	• Private firms carry out fertilizer importation, but FRA buys from two of them and contracts them to carry out a government fertilizer distribution program on credit. Most fertilizer imported for distribution to smallholders goes through FRA program. • FRA fertilizer loan repayment rate is 43%. • Pan-territorial pricing structure for FRA program still maintained.
2000 (2000/01)	• Regional trade patterns emerge as maize is imported into Zambia through Eastern Province from Mozambique, mostly by small-scale traders, and maize is exported from Zambia to Congo's Shaba and Katanga Provinces.
2001 (2001/02)	• July 2001 food balance sheet estimates 200,000 tons import requirement for maize. Import requirements are revised upward by some government statements to 400,000 mt. • August 2001 GRZ announces intention to arrange import of 200,000 mt maize at subsidized prices. GRZ tenders to select importers, maize to be delivered October 2001 through April 2002. • Private traders do not import, despite high domestic prices, because of fear of being undercut by subsidized government imports. • Maize and maize meal VAT is zero rated, but export permits are not issued, effectively banning legal private export of maize. • Government financing of imports is delayed. Starting November 2001, food shortages emerge and prices rise well above CIF price level. • Most government maize imports didn't arrive until December 2001 and January 2002 because of financing difficulties. CIF price reach US$220 to US$260, far above import parity. • By May 2002, only 130,000 had been imported under government program. • Sales at subsidized price of US$160 per ton into mills. Selected millers receive subsidy of US$70 to US$100 per ton of maize purchased. • Government proposes the Crop Marketing Authority (CMA) as a semi-autonomous body corporate, a buyer of last resort whose main preoccupation is to stabilize prices and create markets in remote areas while procuring and selling at market prices and remaining self-sustaining.
2002 (2002/03) 2002 (2002/03) con't.	• Millers' purchases of maize from the 2002 maize harvest are depressed by the availability of subsidized imported maize from the preceding drought year. • Government pressure on the millers to keep the maize meal price low constrains demand for locally produced maize, which is available at relatively high prices due to poor harvest season. • The food balance sheet estimated that the 2002 harvest would lead to a food deficit of 600,000 mt. Consequently, an abnormally early price increase was observed in June 2002. Traders began to buy up maize in anticipation of further price increases based on the experiences of the 2001/2002 marketing season. • Government entered into a *Memorandum of Understanding* with the millers to import 300,000 mt, government to import 180,000 mt as food relief and 120,000 mt as reserves. • The flow of imports was, however, slow because of a ban on GMO maize. Relief operators had to revisit their pipeline in order to supply non-GMO maize.
2003 (2003/04)	• Relatively good maize harvest. Maize and maize meal zero rated for VAT purposes. • FRA sold a total of 26,308 mt of the imported maize stock to the World Food Programme (WFP). Of this quantity, 22,126 mt were destined for export to Zimbabwe. • Government imports in response to the 2002 harvest were late in arriving, some only arriving as

Harvest year (marketing year)	
	the 2003 harvest was being offered for sale. Several thousand tons of maize imports costing as much as US$270/T were arriving in Zambia as farmers were offering their new crop at prices below US$180/T. This scenario fueled *mutual mistrust between government and private sector in the maize market.* • 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. In some districts, taxes on maize amount to roughly 10% of the price received by farmers for maize. These taxes indirectly impede the profitability of commercialized production. • FRA purchases 58,250 mt maize in the 2003/04 marketing year.
2004 (2004/05)	• Maize and maize meal VAT status changes to "exempt" • Government raises maize import duty to 15%. • MACO sets up task force to provide planning guidelines for the establishment of the proposed CMA. • Large physical grain reserves, as originally proposed, would require an extremely large capital outlay, which would have a severe impact on the Government budget. • 2004 harvest projected to be good and Government announces a minimum recommended price of K30,000 per 50kg bag or approximately US$128/mt. This price to be paid by the FRA to smallholder farmers in selected areas. • Millers lobbied for a lifting on the export ban on maize, in order to maintain demand and remunerative producer prices for maize farmers. • Government issues export permits to selected trading/milling firms. • Ministry of Agriculture and the Zambian National Farmers' Union requests for an Agricultural Marketing Development Plan to be drawn, to structure MACO's agricultural marketing policies and programs. • FRA bought a total of 105,000 tons of maize from farmers across the country starting in November to December 2004.
2005 (2005/06) 2005 (2005/06) con't.	• National Food Balance Sheet presented to government showing an import requirement of 85,000 mt, but private sector estimates are 150,000 mt. • Millers request import permits from MACO and duty waiver from Ministry of Finance and National Planning (MFNP) • In September, MACO announces a temporary waiver of import duty and issues import permits for 150,000 tons to millers and 50,000 tons to FRA. FRA purchases 120,000 mt from domestic market at above market prices in deficit year. • MFNP refuses to waive the import duty • After heavy lobbying by all the stakeholders, MFNP agrees in late October to waive duty; MACO issues import permits • Millers begin to contract for imports. • FRA releases 50,000 tons of maize at US$210/ton in December, undercutting importers (CIF import ' • MACO advised private sector to stop importing because they are failing to comply with new phytosanitary regulations. • President Mwanawasa declares a national disaster at the request of Parliament. • Mt. Makulu issues phytosanitary clearance; permits imports to resume after a four-week delay. • President Mwanawasa announces that millers should lower maize prices significantly due to the abrupt strengthening of the Kwacha (up 26% in two weeks). Stakeholders meet with MACO to discuss the maize situation • Import duty waiver extended to 31st March
2006 (2006/07)	• Good harvest. FRA instructed to purchase 386,000 tons of maize at US$190 per ton to support maize prices. • FRA price attract maize from Mozambique and Tanzania supplied by traders

Harvest year (marketing year)	
	• FRA allocated ZK150 billion and borrowed ZK150 billion but prospects of selling at a loss puts doubt on ability to repay the loan independent of subventions from the Treasury • Government restricts export permits to traders and provides FRA with de facto monopoly on the export of maize; some traders and farmers allowed to use FRA export permit later in the season. • FRA exports to Zimbabwe fail because FRA priced itself outside the export market • FRA has difficulty selling the maize in local markets due to good harvest and because of the above-market prices at which they purchased. • FRA estimated to lose US$32 million on maize 2006/07 maize operations. • Maize stock monitoring committee put in place to report on stocks monthly. MACO's rationale is to guarantee national reserves before issuing export permit and to supply maize meal at affordable prices.
2007 (2007/08)	• 250,000 tons FRA carryover stock largest in FRA history • FRA sought government approval to dispose of its old stock below the breakeven price by exporting to Zimbabwe at a loss. • FRA targets to purchase record crop of 400,000 tons by increased depots to 620 in 62 districts – 10 satellite depots per district and 62 holding depots. • Target for strategic reserves revised from 80,000 tons to 200,000 tons • FRA to pay ZK39000 per 50kg bag and continues to attract maize from Tanzania and Mozambique • FRA to get ZK205 billion from government and plans to borrow ZK200 billion from one domestic bank • Minister of Agriculture and Cooperative issues statement to begin allocation of export quotas to associations Millers Association of Zambia (MAZ), Zambia National Farmers' Union (ZNFU) and Grain Traders Association of Zambia (GTAZ) only • FRA issued with export permit for 226,000, MAZ issued with 50,000, GTAZ got permit for 50,000 and ZNFU had permit for 50,000 tons and there is a balance of 50,000 not issued • ZNFU not ready to use 2006/07 allocation, keep extending the permit. Millers and traders quick to utilize their allocation.

Sources: Howard 1994; Pletcher 2000; Jayne et al. 1999; Mwanaumo 1999, Govereh personal notes 2007.

4. EFFECTS OF POST-LIBERALIZATION MAIZE MARKETING AND TRADE POLICIES

A number of studies have approached the evaluation of agricultural market and trade reform by partitioning a country's history into two periods – pre- and post-reform periods – and assessing the trends in outcome variables. Many of these studies have correctly concluded that input use and maize production levels have stagnated in the post-reform period. They then attribute this disappointing performance to the marketing and trade reforms.

As stressed by experimental design theory, the main problem with before vs. after assessments is that numerous conditions may be changing over time and affecting production outcomes besides the one(s) under examination. Constraints on data availability make it difficult to isolate the specific effects of individual policy changes from other conditions and trends affecting the economy such as political turmoil, weather, public expenditure patterns, international market conditions, HIV/AIDS, and other factors affecting agricultural performance. Consequently, most evaluations of the effects of agricultural market reform are subject to an "identification problem" in so far as there are other forces influencing the economy that cannot be controlled for given data limitations.

Another problem with many assessments is that they take a partial equilibrium perspective. In Zambia's case, we have shown in Section 3 that market liberalization, while associated with stagnation in maize production, has been associated with a shifting of crop production to a range of other crops, with the result that overall agricultural production has been increasing at an annual rate of 2.0% between 1990 and 2006. Because the reforms involved both the reduction in state support for maize production (during the 1990-2004 period) and the encouragement of private marketing and regional trade investments for a range of agricultural crops, it might have been anticipated that the reforms would induce shifts in cropping patterns in line with emerging regional comparative advantage. These crop shifts underscore the importance of a general equilibrium analysis as opposed to assessing the effects of reform based on a single crop.

This section identifies seven main impacts of the maize trade and market reforms, as implemented in Zambia: (1) input use on maize and production levels have declined; (2) real maize marketing margins and consumer maize meal prices have declined; (3) real wholesale prices have remained relatively constant over the past 15 years in spite of a reduction in maize production; (4) rural poverty rates declined since the early 1990s; (5) the benefits of government efforts to raise maize price levels in recent years have accrued to a relatively small proportion of large-scale farmers and relatively commercialized smallholder farmers; (6) most smallholder farmers and urban consumers have been made worse off as a result of policy efforts to raise maize price levels; and (7) greater uncertainty in the policy environment slowed development of the maize marketing system and created mixed impacts on the development of regional trade. Each of these six impacts is discussed below.

4.1. Reduction in Maize Production and Input Use on Maize

Evidence that national maize production has stagnated in the post-liberalization period has already been shown in Figure 1. The area planted, fertilizer applied, hybrid seed purchased, and production have all declined since the late 1980s due to a combination of lower real producer prices, higher real fertilizer prices, deteriorating state marketing services, and a reduction in available state credit. Fertilizer use, which peaked in 1988/89 at 264,000 tons, declined to 97,000 tons in 1997/98. Hybrid maize seed purchases declined from 15,000 tons in 1989/90 to 4,799 in 1994/95. Maize area has declined by about 15% since the height of state support to agriculture in the late 1980s.

It bears mentioning that the controlled marketing system that promoted maize production in the 1980s could not be financially sustained. NAMBOARD's pan-territorial pricing was a particularly important drain on the treasury, since this raised the share of maize delivered by smallholders in remote (but often high-potential) areas where transport costs were high. Another major source of loss was the stockpiling of maize, which was largely a consequence of government pricing policy aimed at food self-sufficiency. Allegations of corruption in NAMBOARD were widespread. In some cases, the treasury costs of state marketing operations became so large (over 15% of total annual government expenditures) as to affect the rates of inflation, interest, and currency exchange during the 1980s (Jansen and Muir 1994). Hence, some withdrawal of state support was unavoidable. Today's environment is different however, as there is currently more receptivity in the donor community to budget support, which enables the Zambian government to fund marketing board activities. Donor budget support and highly indebted poor countries (HIPC) debt cancellation are likely to have played a role in the FRA's emergence as the major actor in the maize market during the 2005, 2006, and 2007 marketing seasons.

4.2. Reduction in Maize Marketing Margins and Retail Consumer Prices

This section analyzes the trends in retail maize meal prices and the wholesale-retail margins enjoyed by millers and retailers in Zambia since maize and maize meal prices were decontrolled in the early 1990s. The analysis uses monthly wholesale maize grain and retail breakfast meal price information for the period May 1994 to April 2005, collected by AMIC. Econometric analyses is used to analyze the determinants of maize marketing margins and the trends in these margins over time after controlling for exogenous demand and supply factors such as rainfall, changes in technology, government policy, seasonality in prices and margins and macroeconomic variables (for details, see Chapoto and Jayne forthcoming). All prices were adjusted by the 2005 consumer price index. Data were available for six markets (Lusaka, Choma, Kasama, Kabwe, Ndola, and Chipata).

Wholesale-to-retail maize marketing margins have been trending downwards in 5 of the 6 markets for which data was available (the exception being Chipata). On average the wholesale-to-retail margin declined by 8.9 Kwacha/ton per month (Table 5, column C). Ten years into the reform process, real breakfast meal prices have declined by 35%, while milling/retailing marketing margins have been cut in half (Figure 4a-f). Based on estimates of 3.5 million urban adult equivalent consumers purchasing 120 kg of breakfast meal per year, the declining maize meal milling and retailing margins have saved Zambian consumers roughly US$29.4 million (123 billion kwacha) each year.

Table 5. Linear Trends on the Wholesale Price of Maize Grain, Retail Price of Breakfast Meal, and the Wholesale-retail Margin in Zambia, 1994-2005

Market	Wholesale maize grain prices	Retail breakfast meal prices	Wholesale-retail margin
	Linear trend (Average monthly Kwacha increase or decrease)		
	(A)	(B)	(C)
National Average	1.11	-12.50*	-8.93**
Lusaka	0.46	-9.76*	-9.41**
Choma	1.88	-10.86*	-10.16**
Kabwe	-0.36	-10.66**	-7.20**
Chipata	-4.16	-4.48	-0.28
Ndola	4.26*	-14.84**	-9.60**
Kasama	-0.71	-12.83	-10.03**

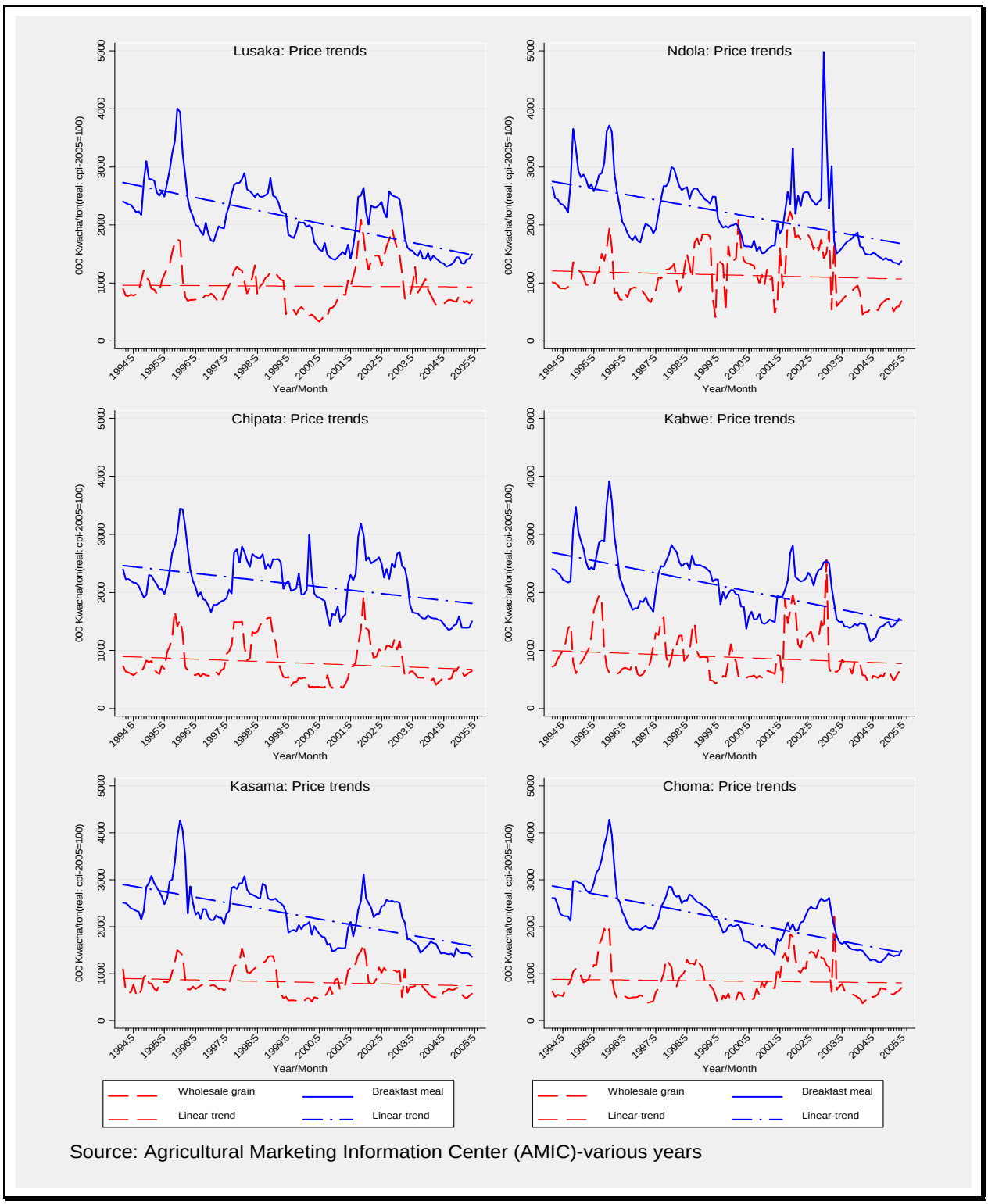
Source: GRZ, AMIC -various years, MACO. Notes: * significant at 5%; ** significant at 1%. Other regressors (not shown) to control for exogenous impacts on prices and margins were rainfall, exchange rate levels and volatility, and seasonal dummies.

There are three explanations for the finding that market reform reduced maize milling/retail margins in Zambia. First, the reforms brought about a more competitive market structure. Prior to market liberalization, a few officially registered maize-processing firms had a *de facto* oligopoly on milling maize and supplying the retail sector. Regulations made it difficult for non-registered millers and traders to transport grain into urban areas or acquire grain from the marketing board. Market reform opened this system to greater competition as small-scale millers and retailers who were previously excluded from entering the market were now allowed to procure and transport grain freely across district boundaries. Rapid investment in medium- and small-scale milling and retailing networks occurred almost immediately after the reforms were implemented. In response to greater competition, the registered large milling companies cut their prices in an attempt to regain lost market share. Greater competition in milling and retailing exerted downward pressure on the milling/retailing margins of the large-scale firms' products, thereby benefiting consumers.

The second explanation for declining maize meal prices has to do with the expanded range of maize meal products available to consumers. The small millers who rapidly entered the market after the reforms produced a range of refined and unrefined maize meal products. *Mugaiwa,* or straight-run meal produced by small millers, appears to be a common and relatively inexpensive staple food product among the urban poor. Before the reforms, small millers were unable to operate in urban areas, because the controlled marketing system prohibited informal grain flows into urban areas.

The third explanation is about the availability of cheaper staple food substitutes. The withdrawal of maize subsidies reduced the consumption of maize and increased consumption of cassava in the cassava belt. The resultant shift in demand towards cheaper substitutes has kept pressure on maize prices to decline.

Figure 4. Trends in Real Wholesale Maize Grain and Breakfast Meal Prices for Six Markets in Zambia between January 1994 and October 2005



The decline in real maize meal prices and marketing margins have brought tangible benefits to consumers. However, the ability of the small- and medium-scale milling sector to keep competitive pressure on the large milling sector will depend on ensuring the availability of maize grain in local markets. In certain years during the liberalization process (e.g., 2001/02 and 2005/06), the government has unintentionally subverted this objective, by announcing that it would import maize to sell at subsidized prices (thus discouraging the private sector from doing so) but then delaying doing so until after supply shortages emerged, which forced market prices to exceed import parity levels (details are documented in Table 4). These are the only periods in the liberalization process when maize prices rose above import parity (see Figure 3). In such cases, due to the scarcity of maize grain in local markets, poor households have no choice but to purchase more expensive industrial maize meal. Low-income consumers' access to food would be greatly improved if imported grain could be sold onto informal local markets instead of channeling all imports to large millers only. The evidence over the past decade indicates that open regional trade for both large and small-scale traders will promote this important food security objective.

4.3. Constant Trend but High Volatility of Real Wholesale Prices of Maize Grain

As shown in Table 5 and Figure 3, inflation-adjusted wholesale market prices have remained largely constant over time, although these prices exhibit great volatility. The fact that real wholesale prices have been roughly constant over time despite the stagnation of maize production growth amidst steady population growth is most likely due to the diversification of staple food consumption patterns. In particular, both cassava and wheat consumption appear to have increased dramatically over the past decade, moderating the impact of population growth on demand for maize and thus retarding upward pressure on maize prices.

The rise of cassava is not unrelated to maize market reform. The elimination of pan-territorial maize pricing policies in the early 1990s reduced the profitability of surplus maize production in remote cassava surplus areas. Cassava production has risen substantially in many of the northern districts of Zambia. These shifts in production have apparently nurtured several highly productive, regularly surplus food production zones, which combine the production of multiple staples, and generally characterized by relatively reliable rainfall conditions. Northern Zambia is one such area, where cassava ensures local food security, even in drought years, enabling the region to export maize to the Democratic Republic of Congo (DRC), Malawi and elsewhere in Zambia (Haggblade 2006). Because farmers can harvest perennial cassava any time of year and over multiple seasons and years, they are able to respond very flexibly to crises as well as chronic shortfalls in neighboring regions.

Looking at Figure 3, the main episodes of maize price volatility in Zambia occurred in the 2001/02 and 2002/03 production seasons. Both years were droughts, but in both years, prices exceeded import parity levels due to a lack of coordination between the public and private sectors. In July 2001, Zambia's national crop forecast and food balance sheet suggested a commercial import requirement of 200,000 tons of maize. In August 2001, Government announced its intention to arrange maize imports to be sold selectively to specified commercial millers at US$75 per ton less than the full c.i.f landed cost at Lusaka. While import arrangements were announced in August 2001, very little government maize had arrived until December 2001. During this period, the private sector refrained from importing commercial supplies, based on the knowledge that subsidized supplies were coming into the country under the Government import program and that private imports would be

uncompetitive in this situation. However, by the end of May 2002, only 130,000 tons had been imported under these government arrangements, not the intended 200,000 tons.

Late and insufficient imports under the Government program had two major effects:

- It stymied private market response to import incentives. Because Government arranged to supply selected milling firms with imported maize at a landed cost of US$160/ton, this ensured that these millers would have a major advantage in selling their products compared to other millers and traders who faced commercial import costs in the range of US$220-260/tonne. This situation effectively froze out the market for all traders except those chosen under the Government program.

- The second outcome was temporary maize shortages and high prices. During the 3-4 months between the tender announcement in August 2001 and the arrival of the first substantial imported volumes in December 2001, local maize prices rose sharply and exceeded import parity levels (Nijhoff et al. 2002). The general public and some analysts have interpreted this situation as evidence of market failure, since in a well-functioning market, local prices should not exceed import parity levels. However, since the time when wholesale maize prices started to be collected by the Ministry of Agriculture in 1994, these market prices have never exceeded import parity levels except when the government has taken responsibility for arranging importation.

4.4. Declining Rural Poverty Rates

The conventional wisdom of ever increasing rural poverty, escalating food prices, and declining productivity of smallholder agriculture is not supported by available evidence in Zambia over the period 1990-2005. Poverty rates in rural areas appear to be declining (Table 6). At the start of the liberalization process in 1991, 88% of rural households were estimated to be under the poverty line. Following the major drought of 1991/92, the rural poverty rate increased to 92% in 1993. However, since this point, rural poverty appears to have declined markedly, to 83% in the late 1990s, and to 74% by 2003[5]. Estimates of "extreme poverty" in rural areas have also declined over the past decade.

Declining rural poverty rates reflect many factors. Yet the maize marketing reforms have contributed to declining rural poverty rates in two important respects. First, by significantly reducing the cost of the main staple food in the country, maize meal, the market reforms have reduced consumers' expenditures and contributed to higher real disposable incomes. Second, the maize market reforms encouraged crop diversification and facilitated the dynamism experienced by other crop sectors since the reforms were implemented. It is indeed difficult to find sources of economic dynamism in Zambia that could explain this apparent reduction in rural poverty rates other than the impressive agricultural growth registered for the non-maize crops shown in Table 2. Fynn and Haggblade (2006) contend that the reduction in rural poverty over the past decade has been driven by the combination of growth of increasingly important food crops such as cassava, sweet potatoes, groundnuts (and most likely, domestically consumed horticultural crops) as well as the export-led growth in cotton and tobacco, which have helped to buoy rural incomes despite the decline in maize production and the well-documented negative shocks affecting rural livelihoods mentioned earlier.

[5] Due to methodological differences, the 2003 poverty estimates are not strictly comparable with poverty estimates for earlier years.

Table 6. Trends in Poverty, HIV Prevalence Rates and Drought, Zambia, 1991-2005

Year	Overall Urban Poverty	Overall Rural Poverty	Extreme Rural Poverty	Drought	Estimated HIV Prevalence Rate
1991	48.6	88.0	80.6		
1992				X	
1993	44.9	92.2	83.5		
1994				X	
1995					16.7
1996	46.0	82.8	68.4		
1997					
1998	56.0	83.1	70.9	X	
1999					
2000					15.8
2001				X	15.6
2002				X	15.2
2003	52.0*	74.0*	52.4*		14.8
2004					14.4
2005					13.9

Sources: Mason et al. 2006, drawing from the Zambia Poverty Reduction Strategy Paper 2002-2004 (2002) and CSO (2003a). HIV Epidemiological Projections from CSO (2005). Drought information from Govereh and Wamulume 2006; Del Ninno and Marini 2005). Note: *The methodology and survey design used to establish these poverty rates differ from those used to calculate poverty rates in previous years, calling into question the comparability of the poverty rates.

Assuming the 2003 poverty estimates are accurate, such a decline in poverty may be considered a remarkable achievement considering the range of adverse processes affecting Zambia during this period, including high rates of HIV prevalence, declining copper revenues up to 2005, frequent drought, and the contraction of public budget support to agriculture.

Urban poverty, on the other hand, rose somewhat between 1991 and 1998. This may reflect both the decline of the copper industry and the elimination of consumer food subsidies in the early 1990s. The increase in urban poverty and decline in rural poverty is all the more interesting in light of evidence of reverse urban-to-rural migration; rural population growth over the 1990-2000 period was 2.9% compared to 1.5% for urban areas (Govereh et al. 2006).

4.5. Concentrated Benefits of Government Efforts to Raise Maize Price Levels

Maize remains the single most important crop in Zambia's smallholder sector. As such, it is commonly understood that policies to influence maize production and input use on maize constitute the major means by which to promote smallholder income growth and food security. Policies of the Zambian government aimed to support smallholder incomes from maize production include producer support prices offered by the Food Reserve Agency, tariffs on imported maize, and government programs to provide subsidized fertilizer for use on maize.

Based on the nationally representative and weighted PHS-Supplemental Surveys, there were an estimated 1,126,921 smallholder households in the 2000/01 marketing year, and 1,267,145 households in the 2003/04 marketing year. We ranked all smallholder households according to their sales of maize and then divided them into three groups:

1. the 5% of farms in the smallholder sector that sold the most maize. This group accounted for 14,261 households in 2000/01 and 17,974 households in 2003/04, and accounted for about 40% to 45% of all the maize sold nationwide by smallholder farmers.

2. the rest of the smallholder farms selling maize (this group accounts for 95% of the smallholder farms selling maize, after excluding the 5% who sell the most maize). This group constituted roughly 272,805 households in 2000/01 and 341,916 households in 2003/04.

3. those smallholder farms not selling any maize. This group was by far the largest group, accounting for between 839,855 and 907,255 households nationwide, in 2000/01 and 2003/04 marketing seasons, respectively.

We then report various indicators of household welfare for these three groups in Table 7. There are remarkable differences between these three groups. Mean household income for Group 1 (the top 5% of maize selling households) was US$2,528 and US$3,847 in 2000/01 and 2003/04 compared to US$577 and US$675 for the remaining 95% of maize selling households, and US$318 and US$415 for the rest of the rural farm households in Zambia not selling any maize. Household incomes of the top 5% of maize selling households were 8-9.2 times higher, on average, than the 75% of the rural farm households in Zambia that did not sell maize.

Table 7 also shows that the total area under crops among the top 5% of maize sellers is 2.5-3 times greater than that of the rest of the maize sellers, and 3.9-4.8 times greater than that of the non-maize selling households. The value of off-farm income among the top 5% of maize sellers was 4-5 times higher than off-farm income of the smaller maize sellers and 7 times higher than that of households not selling maize. The top 5% of maize sellers also had 5-7 times as much revenue from livestock products as the smaller maize sellers, and 8-10 times as much as the households not selling maize. Gross value of crop sales and productive farm assets was equally skewed. And the top 5% of maize sellers tend to be in areas more accessible to markets. Their mean distance to the nearest tarmac road was 15 kilometers compared to 23-24.5 kilometers for the smaller maize sellers, and over 25 kilometers for the rest of the smallholder households.

The picture that emerges from Table 7 is an extremely skewed distribution of farm income and off-farm income, owing to disparities in landholding size, other productive assets, and access to markets. The top 5% of maize sellers account for about 1.3% and 1.4% of the total number of smallholder households in Zambia in 2000/01 and 2003/04. Yet, despite their relatively small numbers, these households accounted for almost half of the maize sales from the smallholder sector, and about 17% and 20% of the total value of crop sales of the smallholder sector.

The households not selling maize, which make up roughly 75% of the total number of smallholder farms in Zambia, are largely subsistence oriented farmers, selling very small surpluses of other crops, have relatively small farm sizes, are generally further from markets and roads, have relatively little off-farm and livestock-related sources of incomes, and, therefore, have very low total incomes.

These numbers indicate a great degree of heterogeneity within Zambia's small farm sector. Policies aimed to support the prices of maize may be benefiting a relatively small- and better-off group of farmers and bypassing the majority of rural households in Zambia.

Table 7. Attributes of the Highest 5% of Maize Sellers Versus the Rest of Maize Sellers and Households not Selling Maize in the 2000/2001 and 2003/2004 Marketing Years (US$ and Kwacha)

Attribute		Marketing year	Highest 5% of maize sellers (n= 14,261 in 2000/01) (n=17,974 in 2003/04)	Rest of maize sellers (n=272,805 in 2000/01) (n=341,916 in 2003/04)	Households not selling maize (n=839,855 in 2000/01) (n=907,255 in 2003/04)	National Total (n=1,126,921 in 2000/01) (n=1,267,145 in 2003/04)
			---------- Mean Values ---------			
Total household income	(US$)	2000/2001	2,528	577	318	409
		2003/2004	3,847	675	415	534
	(Kwacha)	2000/2001	12,123,104	2,765,156	1,525,246	1,959,518
		2003/2004	18,449,496	3,239,131	1,999,788	2,569,387
Value of off-farm income*	(US$)	2000/2001	1,102	276	168	206
		2003/2004	1,453	282	190	233
	(Kwacha)	2000/2001	5,282,832	1,323,951	804,711	987,078
		2003/2004	10,335,555	2,081,427	1,655,130	1,927,706
Gross value of sales	(US$)	2000/2001	1,009	141	48	82
		2003/2004	1,828	196	97	148
	(Kwacha)	2000/2001	4,840,614	674,563	228,401	394,775
		2003/2004	8,765,399	941,093	466,223	712,076
Gross value of maize sales	(US$)	2000/2001	646	53	0	27
		2003/2004	983	62	0	38
	Kwacha)	2000/2001	3,098,547	253,692	0	129,227
		2003/2004	4,711,587	298,680	0	184,442
Value of productive assets	(US$)	2000/2001	1,071	180	117	144
		2003/2004	1,731	317	231	275
	Kwacha)	2000/2001	5,138,034	864,792	558,789	690,816
		2003/2004	8,301,493	1,519,196	1,107,085	1,320,334
Value of income from livestock products	(US$)	2000/2001	97	14	9	12
		2003/2004	175	31	21	26
	Kwacha)	2000/2001	463,877	69,045	44,258	55,569
		2003/2004	891,651	172,615	131,264	155,961
Distance to nearest tarmac road	(km)	2000/2001	15.00	23.17	26.12	25.27
		2003/2004	14.66	24.54	25.79	25.29
Total area under crops	(hectares)	2000/2001	4.91	1.92	1.26	1.47
		2003/2004	6.22	2.04	1.29	1.56

Source: Supplemental Survey to the 1999/2000 Post Harvest Survey, Central Statistical Office, 2000/2001 & 2003/2004 Marketing Season.
Notes: 2000/01 marketing year refers to April 2000 to March 2001; 2003/04 marketing year refers to April 2003 to March 2004.
*see footnote 1.

4.6. Distributional Effects of Policy Efforts to Raise Maize Price Levels

Apart from the widely held notion that the majority of smallholder farmers are sellers of maize there is the related perception that smallholder farmers by and large are self-sufficient in maize and only purchase grain in drought years. This notion has contributed to some of the maize pricing and trade policies specified earlier that raise maize market prices in Zambia. These perceptions also explain the fact that very little attention has been paid to the development of intra-rural grain markets.

Table 8 categorizes rural households according to their position in the maize and maize meal markets in the 2003/04 marketing season.[6] There are seven categories of households with respect to the maize production and marketing patterns:

1. *households that produce and sell maize, and don't purchase maize or maize meal.* These households accounted for 17% and 20% of the smallholder households nationwide in 2000/01 and 2003/04, respectively.

2. *households that produce but don't sell maize, and instead buy maize and/or maize meal.* These households accounted for 25% of the smallholder households nationwide in both marketing years.

3. *households that do not produce or sell maize, but do buy maize and/or maize meal.* These households are located primarily in the northern, northwestern, and Luapula Provinces, and accounted for 9.2% and 9.6% of the smallholder households nationwide in 2000/01 and 2003/04.

4. *households that may produce maize but are not in the market either as maize sellers or purchasers.* These autarkic (non-maize trading) households accounted for 40% and 37% of the smallholder populations nationwide in 2000/01 and 2003/04.

5. *households that produce, sell, and buy maize and/or maize meal, but they sell more than they buy over the course of the year.* These *net maize sellers* accounted for 5.2% and 4.8% of the total number of smallholder households nationwide in the two years.

6. *households that produce, sell, and buy maize and/or maize meal, but they buy more than they sell over the course of the year.* These *net maize buyers* accounted for 3% and 3.3% of the total number of smallholder households nationwide in the two years. Note that the households that both sell maize and buy maize or maize meal in the same year are a relatively small proportion of the total sample of households, less than 10% in either year.

7. *households that produce, sell, and buy maize and/or maize meal with net sales equaling zero.* There are a very few households in this category and are not considered in this discussion.

Table 8 reveals a number of interesting insights about each of these six groups and the sub-groups within them. We first ranked all households nationwide by their household income levels, and then grouped them into 3 income terciles (low, medium, and high). This is shown in the 3rd column of Table 8. This table thus shows the household characteristics for 18 sub-groups (6 maize market position groups * 3 income groups). The seventh group is ignored

[6] We produced a comparable table for the 2000/01 year, which shows fundamentally similar findings but have not included it here due to space limitations.

for this analysis. The table also shows the proportion of households in each of the 6 categories that are in the low, medium, and high income terciles.

Regarding Group 1, for the maize selling households that do not buy maize or maize meal, we see that about half of this group is in the highest income category in both years. These households include 80% of the households in the top 5% of maize sales as discussed earlier in Table 7. Group 1's mean household income (US$1,149 in 2000/01 and US$1,571 in 2003/04) is among the highest of the 18 sub-groups. Landholding size and value of farm assets are also the highest of all 18 sub-groups.

The other two sub-groups within the Group 1 category (producers and sellers of maize in the bottom and middle income terciles), have much lower landholding sizes, educational levels of their household heads, incomes and farm asset values, and have relatively paltry maize and total farm production values (US$18 and US$19 per household in the 2000/01 and 2003/04 seasons, respectively). Even if these households were able to obtain 25% higher prices for their maize, it would add only US$6 and US$4 to these households' annual income, given that they sell such small amounts of maize. The main beneficiary of supportive maize prices would be the highest income group in this category who sell the most maize.

Within Group 2 (households that produce maize but also buy maize and/or maize meal), in both 2000/01 and 2003/04, the largest number of households is in the bottom income tercile. These households produce very few crops, their value of agricultural production being US$62 in 2000/2001 and US$74 in 2003/2004. These low-income maize buyers are among the most food insecure of all sub-groups, as they produce little maize and also produce very little income from other farm and off-farm activities. This group would appear to be adversely affected by relatively high maize prices. On the other hand, the minority of households in Group 2 that are in the top income tercile have relatively high education levels (9 in the two years) and relatively high off-farm incomes, which means that not all maize buyers are poor or among the most vulnerable.

Within Group 3 (households that do not produce maize but do buy maize and/or maize meal), most of these households are also relatively poor, in terms of their total household incomes and assets (a proxy for wealth). Households in this group (and all the other groups), who are in the highest income tercile, have a relatively high mean educational level for the household head and higher off-farm incomes.

Group 4 (households that neither sell nor buy maize), accounts for 40% (2000/01) to 37% (2003/04) of all households nationwide. These households are concentrated in Eastern, Luapula, and Northern Provinces. These households fall disproportionately into the lowest income tercile, and have relatively low incomes, asset levels, farm sizes, and educational levels compared with households in each of the other maize market position groups.

Contrary to widespread perceptions that many smallholder farmers sell grain after harvest and buy back grain later in the season, only about 8% sell and buy back maize according to data from the two seasons (sum of households in Groups 5, 6, and 7 in Tables 8). Within this 8%, there appear to be two types of households. A large proportion of households in these three groups sell large amounts of maize and buy back small amounts of maize meal. These net maize sellers closely resemble the characteristics of households in Group 1 in the highest income group (those that only sell maize).

Table 8. Characteristics of Rural Households According to their Position in the MAIZE AND MAIZE MEAL Markets, 2003/2004 Marketing Year, Zambia

Type of maize seller	% of sample	Income Tercile 1=lowest 3=highest	(number of hh)	Value in US dollars: Net maize + maize meal sales	Value of maize produc-tion	Agricultural production (crop & animal gross revenue)	Off-farm income	Total house-hold income	Value of productive assets	Cropped land size (ha)	Family size (adult equi-valents)	Highest level of education for a member (years)	Distance to nearest tarred/main road (km) from center of SEA	Distance to nearest district town (km) from center of SEA
1. Seller of maize, does not buy maize or maize meal (n=257,160)	20.3	1	32,187	18	59	110	7	116	86	1.1	4.1	5.9	21	44
		2	91,664	37	107	251	29	280	196	1.8	4.9	7.2	28	40
		3	133,309	213	423	878	693	1,571	687	3.2	6.1	9.1	25	34
2. Buyer of maize or maize meal, does not sell, but produces maize (n=315,524)	24.9	1	132,150	-26	42	74	12	86	102	.9	4.8	6.0	24	33
		2	97,915	-31	77	199	65	264	238	1.4	5.4	7.2	24	30
		3	85,460	-52	123	413	994	1,407	738	1.7	6.5	9.2	26	29
3. Buyer of maize or maize meal, does not sell or produce maize (n=121,585)	9.6	1	59,477	-23	0	55	20	75	44	.6	4.2	5.7	20	31
		2	39,336	-28	0	162	111	273	53	1.0	4.9	6.9	17	29
		3	22,772	-51	0	264	870	1,134	336	1.0	5.4	8.8	18	31
4. Not in market (either grain or maize meal) (n=470,145)	37.1	1	206,356	0	30	78	8	86	57	.9	4.0	5.3	29	39
		2	165,879	0	68	234	39	272	197	1.6	5.1	6.6	29	37
		3	97,910	0	157	708	469	1,176	539	2.2	5.8	8.4	26	35
5. Buys and sells, net sales greater than 0 (n=60,601)	4.8	1	7,243	11	58	94	15	109	69	.9	3.6	6.4	13	27
		2	23,314	35	132	239	44	283	97	1.6	5.0	6.9	23	37
		3	30,044	122	290	590	542	1,132	497	2.4	5.9	8.9	19	32
6. Buys and sells, net sales less than 0 (n=41,613)	3.3	1	9,524	-14	56	100	13	112	98	1.2	4.9	6.7	29	45
		2	17,479	-28	92	201	69	270	179	1.4	5.1	6.7	17	32
		3	14,611	-33	111	373	589	963	362	1.8	5.7	8.7	24	26
7. Buys and sells, net sales equal 0 (n=516)	.0	1	326	0	31	70	0	70	9	1.9	2.7	.0	83	74
		2	190	0	142	237	63	300	9	1.4	5.8	10.0	0	27
Total Sample (n=1,267,145)	100.0	1	447,263	-9	33	77	11	88	72	.9	4.3	5.7	26	37
		2	435,777	-1	77	222	51	273	187	1.5	5.1	6.9	26	35
		3	384,105	67	241	653	697	1,350	613	2.4	6.1	8.9	24	32

Source: Supplemental Survey to the 1999/2000 Post Harvest Survey, Central Statistical Office, 2000/2001 and 2003/2004 Marketing Season.

Looking across the entire sample in the last row, it is evident that there appears to be a strong relationship between households' net maize sales, household income, landholding size, value of other crop production, off-farm incomes, value of farm assets, and education levels. Households in the top income tercile are generally net sellers of maize and relatively well-off, while households in the bottom income tercile are buyers of maize and relatively disadvantaged in most respects.

4.7. Greater Uncertainty in the Maize Marketing Policy Environment

Due to frequent policy reversals and changing government mandates, the policy environment in most countries in the region is more uncertain than during the control period. Survey evidence suggests that traders in many countries perceive the agricultural input policy environment as especially unpredictable and subject to change.[7] The perceived threat of government re-entry into the market ranks among the major sources of risk of future investment (Wanzala et al. 2002; Govereh et al. 2002). Politicians' statements about private sector behavior and the need for government re-entry into markets have been a relatively neglected variable in the analyses of private sector response to the reforms (Mwanaumo 1999).

The vicious cycle of government threat of re-entry followed by lack of private sector response is most evident in marketing functions that require big initial investments such as long-distance transport, wholesaling, inter-seasonal storage, and fertilizer importation (Barrett 1997; Stepanek 1999). Much of the limited investment of this type has been by larger foreign-based firms with diversified portfolios that could afford to take risks (Govereh et al. 2002). For marketing functions requiring smaller capital outlays that could be recouped more quickly, such as retailing, assembly, and grain milling, private sector investment response has been less affected by longer-term policy uncertainty (Barrett 1997).

Moreover, most of the silo capacity in countries such as Kenya, Malawi, and Zambia remain in public sector hands. The potential for selling parastatal storage facilities at concessionary prices as part of some future privatization plan acts as a deterrent to new commercial investment in storage (Kopicki 2005). While some analysts point to the large intra-seasonal price variability observed in countries such as Malawi and Zambia as indicators of weak private sector capacity and the limitations of market liberalization, the market environment in most of the region does not provide a meaningful counterfactual to assess the private sector's capacity to engage in inter-seasonal storage.

There is widespread agreement that the food marketing policy environment over the past decade has not effectively supported agricultural productivity growth for the millions of small farmers in the region. Many governments remain important players in their maize markets, both through their direct procurement and sale operations and through their use of discretionary trade policy instruments. Though the quantities they trade are smaller than during the controlled market era, marketing boards in Kenya, Malawi, and Zambia still exert a major presence in the maize markets, handling between 20-50% of marketed volumes. Many countries in the region continue to implement food price stabilization programs of various types. However, government actions in the maize market have become increasingly reactive and short-term in nature, subject to unannounced policy changes that create major risks for private investment (Nijhoff et al. 2002; Rubey 2004) These countries' market

[7] Sachs and Warner (1995) conclude that Africa is the only region of the world in which the degree of openness has not significantly increased during the past two decades.

performance since the 1990s reflects not the impacts of unfettered market forces but rather the mixed policy environment of legalized private trade within the context of continued strong government operations in food markets.

5. ALTERNATIVE POLICY OPTIONS AND THEIR LIKELY IMPACTS

Some donors and the World Bank have carried on continued discussions of alternative maize marketing and trade policy options. These include: (1) reducing the role of the FRA in the maize market and reducing the discretionary role of government in general in the maize market; (2) selling off or leasing government storage assets, primarily old NAMBOARD silos along the line of rail for use by the private sector; (3) reducing controls on regional maize trade to support greater regional integration; and (4) the need for greater government investment in public goods to facilitate the functioning of local and regional maize markets.

5.1. Reducing the Unpredictability of Government Operations in the Maize Market

Where government involvement in food markets is seen as part of a transitional phase towards full market reform, predictable and transparent rules governing state involvement in the markets would reduce market risks and enable greater coordination between private and public decisions in the market. The Zambian government continues to directly intervene in domestic and regional maize market through: (i) somewhat ad hoc issuing of import and export licenses (resulting in de facto export bans at time); (ii) unpredictable timing of changes in import tariff rates; and (iii) state importation and sale of subsidized maize to selected buyers.

5.1.1. Maize Export Ban

The government has twice imposed a maize export ban, in 1995/96 and in 2005. The export ban of 2005 was partially lifted in August 2006 to allow only FRA to export 100 000 metric tons of maize. The banning of private export without prior notice usually strands private firms that have already sourced maize internally for export. For example, international firms such as Louis Dreyfus and Cargill established their operations in Zambia soon after the market reform program was initiated. However, they closed their operations in 1996 after a surprise export ban was announced, which caused these firms to incur large financial losses after having accumulated large maize supplies for export to the DRC.

5.1.2. Maize Import Tariff Rate Uncertainty

Uncertainty as to timing of changes in import tariff rates causes firms' import decisions to be based on guesses as to when government will reduce or eliminate tariff rates rather than based on relative price differences between locations. Unanticipated tariff rate changes act like a random shock to the cost structure of regional trade for firms with no inside information. Firms *with* inside information have a competitive cost advantage in regional trade. Perceptions that some firms have access to inside information about the timing of discretionary government trade policy changes tends to impede investment by firms not having access to insider information. Over time, this restricts competition and impedes the development of a well-functioning regional trading system.

5.1.3. Government Purchase of Maize well above Market Price

To date, the price at which the FRA buys grain from smallholder farmers has always been higher than the prevailing market price. Some few farmers/traders, who have the most maize to sell, will stand to make a lot of money in the short run from such actions. Because 75% of smallholder farmers in Zambia do not sell maize, most rural households in Zambia do not directly benefit from FRA activities. In fact, since about half of Zambia's rural population are net buyers or pure buyers of maize, they are directly hurt to the extent that FRA activities raise the maize price surface. The Zambian taxpayers and international donors that provide budget support pay the bill for these outlays to the relatively few but better-off smallholder farms who sell to FRA. Also, the market uncertainty that FRA casts on the rest of the market, and the "expectations" that FRA and private buyers should acquire more supplies at these prices, discourage private buyers from investing in the market in a major way.

5.1.4. Government Disposal of Maize in the Domestic Market below Market Price

In recent years, the FRA's large maize purchasing operations at above-market prices makes it difficult to sell its stocks at market prices. As a result, it has accumulated unprecedented carry-over stocks which it can only sell at a loss. FRA's disposal of maize in the domestic markets is not only selectively directed to large industrial millers (therefore impeding competition at the milling stage) but it is done at prices below market prices. This manner of operation crowds out the private sector in a variety of ways. It makes it difficult for assemblers and wholesalers to purchase grain in rural areas where the FRA is buying at above-market prices. It also gives millers able to buy FRA grain at below-market prices an advantage over other millers, particularly the hundreds of small- and medium-scale millers that provide competitive pressure on the industrial millers. Over time, this type of government operation is likely to restrict competition and prevent the achievement of efficiency gains in marketing.

5.1.5. Government Importation and Sale of Subsidized Maize to Selected Buyers

The FRA frequently imports maize in quantities that are large compared to the size of the market, and sells to large scale millers at prices that are substantially lower than the costs of commercial importation. The private sector is at risk of watching its stocks lose value, and in this environment, stockholding is extremely risky and there are no assurances that normal intra-seasonal price rises will occur due to the uncertainty over government action.

5.1.6. Poorly Implemented Government Actions

In times of shortfall, government allocates import licenses for particular volumes. The manner in which these import licenses are distributed is not transparent according to some traders and millers, and this has led to perceptions of favoritism in the allocation on import licenses. Some firms complain that there should be no licenses required for importation. For example, in an effort to protect poor consumers the delayed importation of maize by government in 1999, 2001, and 2005 led to price surges well above the import parity (see Nihoff et al. 2002; Mwanaumo et al. 2005). The upshot from this is that well-intentioned but poorly implemented government actions can exacerbate food price instability rather than reduce it.

5.1.7. Internal Levies on Maize Grain across District Boundaries

Levies on the movement of maize across district boundaries have been implemented in Zambia for many years. Mwiinga et al. (2005) found that the levies on maize grain ranged from 2 percent to 13 percent of the wholesale price and that farmers end up paying much of this tax. The levy on inter-district maize movement has recently been reduced to a uniform level of roughly 2% of the value of grain. While this is a positive step, the internal levy still reduces farmers' revenue from participating in maize markets and raise consumer prices.

An alternative proposal for maize marketing and trade policy is to adopt a more coordinated and "rules based" approach to the use of domestic and trade policy tools, based on the recognition that maize marketing and trade are part of an interdependent system. The quantities and prices at which FRA purchases and sells maize are likely to affect informal cross-border trade flows, and hence domestic supplies and market prices. Government may, therefore, aim to develop a holistic and coordinated approach to the use of tariff rates, quantitative trade restrictions, marketing board purchase and sales prices, and quantities to be purchased and sold, based on the recognition that each of these policy tools affects the consequences of using other policy tools. Above all, there is a need for greater coordination and consultation between the government and private traders, which would be facilitated by a rules-based approach to the use of particular policy tools (e.g., government will not buy maize until market prices go below a certain floor price threshold; government will not sell maize until prices go above a certain level; government buy and sell prices are determined transparently in relation to an explicit reference price, etc).

5.2. Mechanisms for Inducing Greater Investment in Grain Storage to Reduce Price Volatility

While insufficient and unprotected storage facilities are widely cited as impeding the performance of Zambia's maize marketing system, very little investment has been made by the private sector in grain storage since the liberalization program began. Several firms have noted that there is a great deal of unutilized storage capacity resulting from the deterioration and dis-use of the former NAMBOARD silos along the line of rail. Some firms have expressed an interest in taking 10-15 year leases in order to provide an incentive to make long-term investments to rehabilitate these silos. This almost happened in 2004/05 but other firms apparently complained that silo space was being offered selectively to particular firms, and government cancelled the lease.

There is something of a "catch-22" with regard to the development of new (or rehabilitation of existing) storage facilities in many African countries, despite the critical need for additional usable storage space in many areas. Most of the grain silo space in Zambia remain in the hands of the government Food Reserve Agency. Despite the fact that additional usable storage facilities are a major contributory problem to output price slumps during good harvest years, there is a lack of clarity about whether and how the non-operational public silos are to be sold off or transferred to private firms under a comprehensive restructuring process. This uncertainty impedes the incentives for new private investment in grain storage (Kopicki 2005). There are worries that government storage facilities could be sold at discounted prices to politically well-connected firms or individuals starting up new marketing firms. Their subsidized cost structure would put other competing firms (which might otherwise consider paying full commercial costs for investments in storage) at a competitive disadvantage.

Private investment in capital intensive storage and other dedicated marketing assets could be rendered unprofitable if the FRA were to re-enter the market in a big way in the future, buying at above-market prices, selling at below-market prices, and covering its trading losses through the treasury. In this way, the uncertainty with regard to future maize marketing policy in Zambia is clearly impeding the development of the maize marketing system in a way that could over time allow it to reduce downside price risks for small farmers. Greater policy stability and future predictability of the policy and institutional environment are hence major priorities for supporting smallholder productivity growth.

Another problem cited by Zambian grain traders that impedes investment in storage facilities is the uncompetitive nature of the local banking system. The Zambian banking system widely perceived to be "risk averse" and currently not conducive to the same kinds of banking services offered to grain traders in South Africa and other more developed countries, hence, some local trading firms take out loans from South African banks. Some traders complained that the Zambian banking system is inhibiting the development of the grain marketing system by taking a conservative approach and investing in Treasury bonds. This ties up money that could be invested in the grain marketing system. Representatives of local banks counter that investment in T-bills is more attractive than risky loans to grain traders, given all the uncertainty in the maize market (Moller et al. 2008). In this manner, the policy uncertainty in the maize market impedes the supply of funds available for investment in the maize marketing system.

A third issue associated with grain storage concerns recent attempts to publicize aggregate grain stocks held by various marketing actors. Public information on the aggregate maize stocks held by all marketing agents in the country could be important for signaling future market conditions and allow firms to make import/export decisions with less likelihood of overshooting or undershooting requirements in relation to supply. The government and agricultural sector stakeholders have been working on developing a system whereby information on monthly maize stock levels is requested of all registered traders and millers. Yet some firms are reluctant to provide accurate information on their stock levels because they feel that this information could be leaked to competitors, which would disadvantage them in future transactions. For example, if a milling firm were found to have very low stock levels, this might enable potential suppliers to press for harder bargaining terms.

Interestingly, most large traders and millers in Zambia have gone on record stating that it was important to have a national strategic stockpile of maize. However, there were wide-ranging views on how it should operate and what its optimal size should be. It is clear that if the national stockpile is managed in an unpredictable manner, the private sector would be likely to reduce its own storage operations. The phenomenon of subsidized government intervention in the market, or the threat of it, leading to private sector inaction, has been one of the greatest problems plaguing the food marketing systems in the region. Effective coordination between the private and public sector would require greater consultation and transparency with regard to changes in parastatal purchase and sale prices, import and export decisions, and stock release triggers. As stated by Oygard et al. (2003), "unless some very predictable and credible management rules can be established for the reserve, private agents will be reluctant to hold stocks, out of a fear that the reserve will be sold out at unpredictable times at subsidized prices, undercutting the value of their stored commodity."

This approach does not imply that government need be impassive. The big problem is to avoid swamping the whole system with government stock releases that is uncoordinated with what the private sector is doing.

5.3. Cross-border Maize Trade Flows

Table 9 reports the formal maize trade flows (imports and exports) for Zambia by source over the period 1999 – 2004. Table 8 shows that the bulk of the imports into Zambia during a deficit period come from South Africa (67.7%) followed by Zimbabwe.

Table 9. Formal Cross Border Maize Trade Flows in Zambia: Imports and Exports

Source/Year	1999	2000	2001	2002	2003	2004	Total	% of total exports
	---------- Exports (metric tons) ----------							
Angola	0	5	0	0	647	1,005	**1,657**	**0.4**
Botswana		418	491	232	1,513	3,108	**5,763**	**1.5**
Burundi	0	112	0	0.0	0	0	**112**	**0.0**
DRC	16,590	14,785	16,589	482	2,407	16,451	**67,306**	**17.5**
Congo republic of	0	0	652	1	0	0	**654**	**0.2**
Egypt	0	0	0	19	0	0	**19**	**0.0**
Kenya	0	0	0	10	0	2,479	**2,489**	**0.6**
Lesotho	0	90	25	74	150	1,177	**1,516**	**0.4**
Malawi	0	146	290	3,563	7,917	43,420	**55,336**	**14.4**
Mozambique	0	1	0	0	0	24	**25**	**0.0**
Namibia	0	0	18	612	375	597	**1,603**	**0.4**
South Africa	25	5,530	7,801	2,827	4,682	8,865	**29731**	**7.7**
Tanzania	290	94	550	78	150	9,539	**10,701**	**2.8**
Uganda	0	0	33	39	0	61	**133**	**0.0**
Zimbabwe	7,801	2,824	730	223	20,792	171,327	**203,699**	**53.0**
Other [a]	513	189	31	332	353	1,921	**3342**	**0.9**
Total	**24,706**	**24,007**	**27,181**	**8,163**	**38,634**	**258,057**	**384,092**	**100**
	---------- Imports (metric tons) ----------						**Total**	**% of total imports**
Botswana	35	115	45	1,061	218	0	**1,476**	**0.4**
DRC	0	2	44	284	330	0	**661**	**0.2**
Egypt	0	0	0	24	133	0	**157**	**0.0**
Kenya	8	116	499	1,612	1,711	12,769	**16,715**	**4.1**
Malawi	260	768	227	70	161	24	**1,511**	**0.4**
Mozambique	163	412	6	1	8,646	0	**9,229**	**2.3**
Namibia	136	155	120	75	28	68	**585**	**0.1**
South Africa	17,770	2,976	19,501	126,080	101,148	7,664	**275,142**	**67.7**
Tanzania	2,329	3,792	813	13,062	15,661	86	**35,744**	**8.8**
Uganda	0	0	0	13,062	0	0	**13,062**	**3.2**
Zimbabwe	8,456	4,984	5,932	9,703	2,455	1,882	**33,415**	**8.2**
Other	256	524	847	9,547	7,391	138	**18,704**	**4.6**
Total	29,159	13,323	27,191	165,036	130,496	22,496	406,408	**100**

Source: FAO Stat. Downloadable at: http://faostat.fao.org/site/601/default.aspx, accessed August 2006.
Notes: a. Other includes imports and exports from all other countries not in the eastern and southern Africa region.

Using actual cross border trade data recorded by the Zambia Export Board during the period July 2004 to March 2006, we examine trends in informal cross border maize trade between Zambia and neighboring countries: DRC, Tanzania, Mozambique, Zimbabwe and Malawi.

Table 10 shows the informal maize cross border imports, exports and net exports from July 2004 to March 2006. A number of interesting findings are discernable:

- *First*, the Democratic Republic of the Congo is a major source of demand for Zambian maize and mealie meal with 45% of the total informal trade exports for the period July 2004 to March 2006 going to the DRC. DRC buyers come to Lusaka to buy grain from the traders and millers, and pay cash up front. The Copperbelt millers reported that a minimum of 10% of their product is shipped to DRC per annum. However, these millers lamented over the government's constant export bans which were counterproductive because the milling technology they employ produce 25% roller meal by design and this roller meal has very little market in Zambia but has a huge market in the DRC. As such in times of bans they are stuck with this roller meal as evidenced in the 2005/2006 marketing season.

- *Second*, during the same period, 46% of the total exports were from Zambia to Zimbabwe. Due to the foreign currency problems and controls in Zimbabwe they are reports that payments had become unreliable and firms are now reluctant to supply maize to Zimbabwean customers on consignment.

- *Third*, during the 2004/2005 marketing season the amount of informal imports coming from southern Tanzania increased due to good harvest there, and prices landed in Lusaka were cheaper than from South Africa. Nevertheless, the big millers in Lusaka reported that they were not buying from Tanzania because the grain was reputedly of poorer quality and millers were willing to pay US$20 per ton more to get superior quality maize from South Africa. Some firms expressed the need for streamlined border/customs clearing processes and delays.

Achieving this could cut down on needed size of strategic stock by cutting down on the delivery time of imports. As of 2006, there was a 3-day delay for grain coming through Beitbridge border post.

Cross border maize trade 'exports' and 'imports' play a key role in stabilizing the maize deficit and surplus situations in Zambia. To correctly predict the maize situation in the country, government and other stakeholders in the maize market require accurate information about trading partners and how much maize grain and meal is flowing into and out of Zambia. Hence, while there are good reasons for government to retain the issuing of import and export permits, the benefits of regional trade could be achieved by reducing the transaction costs associated with applying for and obtaining trading permits as well as by granting applications for permits freely instead of the current practice of restricting the issuance of permits to selected firms. By allowing traders to choose when and how much maize to trade across borders (instead of government through restrictive issuing of permits), Zambia's maize price surface would become more integrated with the rest of the region, facilitating the maize without borders principle, and helping to develop more stable and reliable trading networks within the region.

Table 10. Measured Informal Cross Border Maize Trade from (Exports) and to (Imports) Zambia and Net Exports in Metric Tons[a]

Source	Jul-Dec 2004		Jan-Dec 2005		Jan – Mar 2006		----------Total [July 2004-March 2006]---------				
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	% of total exports	Imports	% of total imports	Net exports[b]
	A	B	C	D	E	F	G	H	I	J	K
Tanzania	91	2717	2	13265	0	1273	93	0.3	17255	99.1	-17162
Mozambique	0	0	0	49	55	0	55	0.3	49	0.3	6
Malawi	1974	19	488	79	0	17	2462	8.4	115	0.6	2347
Zimbabwe	8290	0	4936	0	62	0	13288	46.0	0.0	0.00	13288
DRC	3310	0	9657	0	33	0	13000	45.0	0.0	0.00	13000
Total	**13665**	**2736**	**15083**	**13393**	**150**	**1290**	**28898**	**100**	**17419**	**100**	**11479**

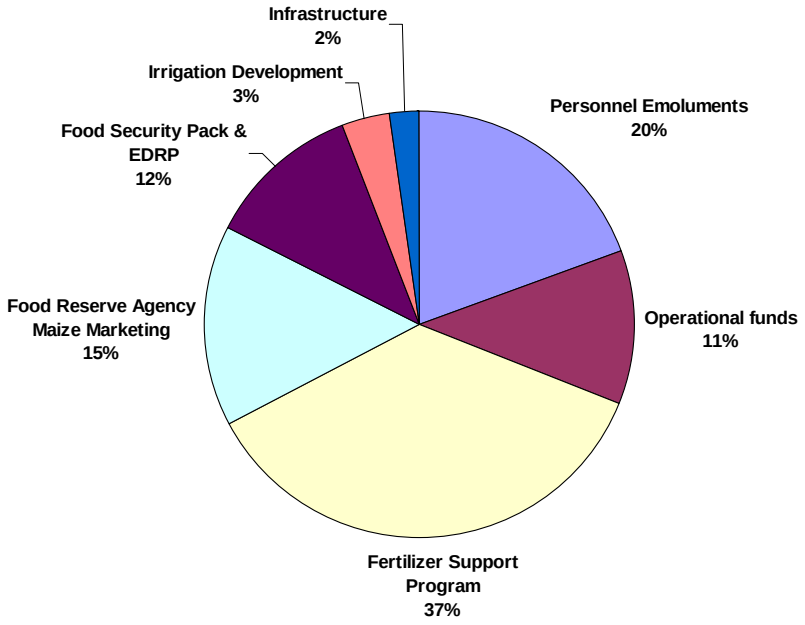
Source: WFP/FEWSNET Downloadable at: http://www.fews.net
Notes: [a] These are estimates based on key information from seven major borders crossings. Trade from other minor border crossing and illegal trade are not captured. Informal cross border trade reported in Table 10 is only a partial estimate.[b] Net exports are computed as the difference between exports and imports

5.4. Increased Government Investment in Public Goods to Facilitate the Functioning of Local and Regional Maize Trade

The ability of smallholder farmers to participate in markets and benefit from trade depends on their ability to efficiently produce a surplus, which in turn depends on their access to productive technologies and knowledge of how to use them (Barrett 2007). The co-existence of relatively low levels of small farm productivity in Africa and the availability and widespread use of technical knowledge and productivity-enhancing inputs in many other parts of the world indicates the need for attention to the barriers to the adoption of productivity-enhancing inputs in African agricultural systems. From the point of view of the individual farmer, it is clearly not a single problem or factor that describes the opportunity set. It is a system. Investments in public goods such as roads, research and development systems to produce viable seed and input technology appropriate to the range of smallholder conditions found in Zambia, innovative systems to promote farmers' knowledge of how to best use these technologies, and other types of public information are all synergistic. Governments' public investment patterns thus shape the performance of markets over time by influencing farmers' productivity and ability to produce for the market.

A great deal of research evidence from southern Africa as well as around the world indicates that the greatest contribution that public sector resources can make to sustained agricultural growth and poverty reduction is from sustained investment in crop science, effective extension programs, physical infrastructure, and a stable and supportive policy environment (Mellor 1976; Byerlee and Eicher 1997; Alston et al. 2000; Evenson 2001). Overall returns on African maize research have been estimated at 30-40 % per annum (Gilbert et al. 1993). Today, the estimate could be even higher, since improved maize varieties have spread rapidly in Africa during the past 10-15 years since Gilbert et al.'s study. These are outstanding returns, substantially exceeding those achieved by most other public expenditures. The economic assessment evidence indicates that if the resources that were spent on crop science in the 1960s, 1970s, and 1980s had been spent on something else instead, African economies would now be poorer, government finances would be in worse shape, food import bills would

Figure 5. Public Sector Budget Allocation to the Agricultural Sector, Zambia, 2005



Source: Government of the Republic of Zambia. 2005. Ministry of Finance, Lusaka.

be higher than they are now, and more Africans would suffer from food insecurity (Masters, Bedingar, and Oehmke 1998). However, these conclusions have not alleviated the problem of chronic under-investment in agricultural Research and Development (R&D) and African agriculture more generally.

Unfortunately, the genetic advances that were a major factor in the maize productivity growth experienced by Zambian smallholders in the 1980s have waned as funding by both donors and government has declined. The Government of Zambia has devoted roughly 6% of its annual budget to the agricultural sector over the past several years, and of this, less than 4% has been allocated to agricultural research. Of this 4%, 75% is for salaries and wages (Figure 5). Effectively, public sector agricultural research and extension have come to a standstill in Zambia.

By contrast, 64% of Zambia's public budget allocation to agriculture in 2005 was for fertilizer subsidy and maize purchase operations (the Fertilizer Support Programme, Food Reserve Agency, and Food Security Pack and Emergency Drought Recovery Programme, as shown in Figure 5). Public resource allocation patterns are tilted quite strongly to subsidy programs, which may provide very important benefits in the short run. However, as indicated earlier, most of the benefits of these subsidy programs go to the larger and relatively well-off smallholder households. The farmers receiving subsidized FRA fertilizer and the farmers selling maize to the FRA are significantly better off than households not receiving these benefits. Because resources are scarce, there is a high opportunity cost of 2/3 of the public budget to agriculture being spent on subsidies captured by the most commercialized and well-off farm households.

In spite of this public budget allocation pattern, many aspects of smallholder agriculture are growing impressively. Cassava, sweet potato, and groundnut productivity have all benefited

from earlier investments in R&D in the 1980s, resulting in improved varieties released in the early-1990s. Cassava has also substituted for maize area in remote areas after the withdrawal of pan-territorial maize pricing policies. Cotton has expanded rapidly thanks to sustained private investment in developing a smallholder-led cotton production base. Cotton is now grown by about 20% of smallholder farmers in Zambia. Horticultural crops and animal products (while unmeasured in the PHS surveys) also appear to be growing rapidly. The value of animal product and horticultural sales are, individually, almost as high as that for maize (Zulu, Jayne, and Beaver 2006). Major production growth is being achieved in other unregulated crops as well, notably groundnut, soybeans, and tobacco. Ironically, the crop benefiting almost exclusively from public fertilizer subsidy programs – maize – has registered less than 1% annual production growth over the past decade.

Fortunately in Zambia's case, a comprehensive review of programs and strategies to expand agricultural productivity has been undertaken, and is laid out in two plans: the Agricultural Market Development Plan (AMDP) and the Agricultural Inputs Development Plan (AIM) (GRZ 2004; GRZ 2005. Both of these plans take a holistic approach to promoting equitable rural productivity and income growth. The AMDP and AIM highlight the importance of: (1) increased budget allocations to crop science research to generate more productive seeds and agronomic practices over time; (2) greater investment in physical infrastructure to drive down the costs of marketing; (3) improved national crop production forecasts[8]; and (4) encouraging new entry and investment in the banking sector to become more supportive of investment in grain marketing system. Banking system investment in grain marketing is related to the expected risks and returns to grain trading. Therefore, achieving greater financing for grain value chain development is likely to require government action to reduce risks of marketing agents (move away from discretionary operations, pan-territorial and pan-seasonal prices, sporadic export bans and unpredictable timing of variable import duty levels.

Agricultural development strategies and public goods investments that can successfully drive down costs within the marketing system can simultaneously raise the incomes of farmers, improve poor peoples' food security and disposable incomes, and encourage the types of structural transformation processes that have contributed to economic development in other developing areas.

[8] There is a great deal of uncertainty and error into the computation of national food balance sheets and import requirements due to both the manner of data collection and analysis by the Central Statistical Office on its agricultural production surveys of the smallholder sector, as well a breakdown in participation of the large-scale farm sector in crop production estimates. Since the maize sold from large-scale farms is roughly estimated to account for 1/3 to 1/2 of the total marketed maize output, major errors in import requirements can result if wrong assumptions are made about large-scale maize production and marketed output, which would affect price levels, the degree of instability, and the entire operation of the maize value chain. It is likely that inter- and intra-annual price instability may be exacerbated by errors in the estimated supply-demand balance resulting from inaccurate crop production estimates.

6. CONCLUSIONS AND POLICY IMPLICATIONS

Fifteen years after the initiation of agricultural reform programs in Zambia, maize marketing and trade policies are again fundamentally similar to the controlled marketing systems of their earlier histories. The Chiluba government deregulated maize prices and private trade in the early 1990s but retained a limited government role in the market and frequently arranged maize imports to ensure adequate food supplies during drought years. However, since 2005 the Mwanawasa government has substantially increased the role of the Food Reserve Agency, which now buys at least half of the marketed maize surplus produced by smallholder farmers at prices well above market levels. The government has tightened its control over the issuance of import and export permits, such that, in addition to the FRA, only a few selected traders and millers able to get permits from government are allowed to legally engage in cross-border trade. Within this policy environment, there is limited scope for additional private investment, especially in the more remote smallholder areas where the FRA's pan-territorial and above-market pricing structure makes it difficult for traders to operate profitably. Limited private trade in these areas contributes to policy makers' perceptions that markets do not function effectively, which reinforce calls for continued and even more proactive government involvement in maize marketing.

Directly after the partial withdrawal of government maize production subsidies and pan-territorial pricing in the early 1990s, maize area and production declined, as did fertilizer use. These developments in the maize sector were the focus of great attention by policy makers and analysts. Less noticed was the substitution effects in production and consumption that occurred as a result of the reforms, leading to relatively high production growth rates for crops such as cassava, groundnuts, sweet potatoes, cotton, tobacco, and animal products. Horticultural crops also appear to have become very important sources of income for smallholders especially in the northern regions of Zambia. Overall, agricultural growth rates between 1990 and 2006 have averaged 2.0%. This is clearly insufficient to generate rapid rural income growth and poverty reduction, though poverty rates have declined steadily since the early 1990s. Real maize meal prices have declined significantly due to rapid investment and increased competition in the maize milling industry. This has clearly helped urban consumers and rural farm households that are buyers of maize meal. Yet over half of Zambia's rural population remains below the poverty line. Government's decision in the past 2-3 years to engage more aggressively in maize marketing and trade reflects a view that something different is needed to kick-start agricultural growth and rural development.

It is unclear whether the resurgent government involvement in maize marketing and trade will lead to a shift in cropping patterns back to maize, as in the NAMBOARD days, whether this will dampen production growth in other crops, and how these developments will affect overall rural and urban welfare. Yet there are a few clues based on applied analysis of household survey data to guide policy:

First, the marketed maize output from the small farm sector is produced by a relatively small proportion of households, roughly 25% of the total in any given year. Second, most rural households, and especially the poor, are buyers of staple food, and are directly hurt by pricing and trade policies to raise maize price levels. Third, very few smallholder farmers derive income from agricultural wage labor (Bigsten and Tengstam forthcoming) and, therefore, while rising food prices might raise the demand for farm labor, this is unlikely to add much to rural household incomes. These considerations cast some doubt on the view that FRA's resurgent maize purchase operations and associated import restrictions have benefited most rural farm households in Zambia.

Although mean-neutral price stabilization could potentially have important benefits for low-income consumers, these benefits do not appear to have been successfully achieved by the existing mix of import tariffs, sporadic export bans, and marketing board operations to influence producer and consumer prices. Maize price instability in Zambia is extremely high despite the persistence of these government operations. While it is analytically difficult to estimate the counterfactual – i.e., the level and instability of maize prices that would have prevailed over the past 15 years in the absence of these government operations – there are strong indications that at least some aspects of government interventions in the market have exacerbated rather than reduced price instability for both producers and consumers. In some countries in the region, government policy has tended to raise maize market prices, generating distributional effects that were most likely anti-poor. While data are generally not available to estimate the full general equilibrium effects of government price policy, including their effects on the labor market, the information on small farm production and marketing patterns presented earlier in this paper suggest that mean-raising price policies are likely to have very concentrated benefits among relatively large farmers and would constitute a direct tax on consumers, many of whom are small farmers living in rural areas.

Two major challenges are: (i) how to move away from a situation where leaders feel they have to be seen as doing something directly and taking populist stances that may entrench dependence on food or fertilizer handouts in response to instability-related food crises, but which do little to alleviate poverty or hunger in the longer run; and (ii) how to create constituencies for policies that are believed to promote market stability and food security, but which may not necessarily provide short-term patronage benefits. Given that governments are likely to continue intervening in food markets, there are several guidelines that might be followed to improve overall market performance:

- Follow clearly-defined and transparent rules for triggering government intervention.

In countries where government involvement in food markets is seen as part of a transitional phase towards full market reform, predictable and transparent rules governing state involvement in the markets would reduce market risks and enable greater coordination between private and public decisions in the market. The phenomenon of subsidized government intervention in the market, or the threat of it, leading to private sector inaction, is one of the greatest problems plaguing the food marketing systems in the region. Effective coordination between the private and public sector would require greater consultation and transparency with regard to changes in parastatal and private firms purchase and sale prices, import and export decisions, and stock release triggers (Moller, Abbink, and Jayne 2008.) This approach does not imply that government need be impassive. The big problem is to avoid swamping the whole system with government stock releases or relief aid that is uncoordinated with what the private sector is doing;

- Ensure grain availability in local markets for small millers.

Small-scale millers play an important food security role in the region. As long as grain is available in local markets, a large proportion of urban consumers (and rural maize-buying farm households) buy grain from local retailers and pay a fee to mill the grain into meal (*mugaiwa*) at a local small mill. *Mugaiwa* is usually considerably cheaper than packaged maize meals because of lower milling costs and fewer services (e.g., no packaging). *Mugaiwa* also has a higher nutritional content than refined packaged meal. Urban consumer surveys in Zambia and Mozambique show that most of the urban poor rely primarily on small millers for their maize meal as long as it is available (Mwiinga et al. 2003; Jayne and Jones

1997). Mwiinga et al. (2003) found than consumers eating *mugaiwa* could reduce their maize expenditures by 20% in urban Zambia compared to those purchasing the same amount of packaged roller or breakfast meal.

However, during years of local production shortfalls, grain supplies in local markets dwindle later in the season, making it difficult for consumers to source grain for *mugaiwa*. Industrial mills linked to the formal marketing systems have traditionally been given permits to import maize, or been ensured preferential access to government-imported maize, resulting in a temporary increase in market share for industrial maize meal during drought years. In Zambia, this occurred in 2001/02, following the government importation of some 150,000 tons of maize which was channeled exclusively to industrial mills. Low-income consumers were forced to pay a higher price for maize meal than would have been the case if imported grain were released onto informal markets through small traders. The potential for consumers to avoid these unnecessary price increases for maize meal could be improved, first, by simplifying and streamlining customs procedures to encourage regional trade by small traders. These traders are the most likely to continue supplying local retailers linked to small mills, and thus have a large impact on the affordability of maize for poor consumers. Second, if governments choose to arrange imports themselves, they might consider tendering arrangements that allow small traders and millers to compete for the grain;

- Public goods investments

Many agricultural market failure problems in Africa reflect an under-provision of public goods investments to drive down the costs of marketing and contracting. Getting markets to function effectively is likely to require increased commitment to investing in public goods (e.g., road, rail and port infrastructure, R&D, agricultural extension systems, market information systems) and institutional change to promote the functioning of market-oriented trading systems. Unfortunately the large share of government expenditures devoted to food and input marketing operations represents a high opportunity cost in terms of foregone public goods investments to promote the functioning of viable food markets and foregone private investment that is crowded out by government operations;

- Promote supply chain development for a wider set of crops.

Governments may promote more stable farm revenue and consumption patterns through supporting private systems of input delivery, finance, and commodity marketing for a range of crops that offer higher returns to farming in the changing environment of Africa's rural areas. Such investments would represent a shift from the strategy of price stabilization and price support for a dominant staple grain to a portfolio approach that puts greater emphasis on a range of higher-valued commodities. This approach would shift the emphasis from direct approaches to stabilize and/or support the price for a dominant staple grain to one of minimizing the impact of food price instability by making the socio-political economy less vulnerable to the effects of food price instability.

Maize will remain a crucial part of the region's food security equation in two ways: first, as a purchased commodity for satisfying the food requirements of a more diversified rural economy; and second, as a cash crop in areas where it is agro-ecologically suited to provide high returns.

Rising land constraints will progressively encourage farmers to shift toward crops providing high returns to scarce land. Because much of Africa is experiencing increased land pressure

and limited potential for area expansion, population growth is causing a decline in land/labor ratios and farm sizes are declining. Maize is a relatively low value-to-bulk crop that currently provides high returns to fertilizer application and land in a limited number of areas in Zambia. Given reasonable assumptions about the potential for future productivity gains, it is unlikely that maize will provide sufficient net revenue for most smallholder farms that are 0.5-1.0 hectares or smaller to generate substantial income growth, especially in the semi-arid areas.

Therefore, the stagnant maize production situation in Zambia over the past 15 years may be a logical consequence of population growth, land pressure, and diversification into higher-value crops and animal-based enterprises. Yet, because it accounts for such a large share of cropped area in the smallholder sector, maize productivity growth will remain a crucial objective. If it can be achieved, it will reduce import dependence and remain a source of dynamism and growth within the smallholder sector. But broad-based improvements in rural livelihoods and incomes will also require productivity growth for other crops: oilseed crops, horticulture, animal products, and other food crops such as cassava. As shown in Table 2, many of these crops are already experiencing high rates of production growth since the early 1990s.

Research evidence from southern Africa as well as around the world indicates that the greatest contribution that public sector resources can make to sustained agricultural growth and poverty reduction is from sustained investment in crop science, effective extension programs, physical infrastructure, and a stable and supportive marketing policy environment for a range of crops that provide income growth opportunities for smallholders in a range of different agro-ecological environments (Mwanaumo et al. 2005). Toward this end, greater transparency and coordination between private and public market actors in agricultural markets can promote the achievement of food price stability, productivity growth, and sustained poverty reduction; and

- Governance and markets

The issue of how to stabilize food markets and prices is transcended by issues of governance. A comprehensive approach for addressing the problems of food price instability and risk in low-income countries requires a framework that provides a clear understanding of the political economy and institutional context in which food marketing policy making occurs. A political economy approach is required to move beyond analysis that either attributes failure to implement reforms and encourage market-based risk transfer mechanisms to insufficient "political will", or advocates greater state involvement in marketing and pricing to address market weaknesses without convincingly demonstrating how the failures of past state intervention can be overcome in the future. The strategic interactions between government and private sector and their potential effects on food security underscore the need for greater transparency and consultation between private and public market actors to achieve reasonable levels of price stability within the dual food marketing systems that characterize most of the region.

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