GRAIN MARKETING POLICY AT THE CROSSROADS: CHALLENGES FOR EASTERN AND SOUTHERN AFRICA

T.S. Jayne,[*] Antony Chapoto,[**] and J. Govereh[**]

Draft version: February 26, 2007

Paper prepared for the FAO workshop on "Staple Food Trade and Market Policy Options for Promoting Development in Eastern and Southern Africa", FAO Headquarters, Rome, Italy, March 1-2, 2007

Abstract

Driven mostly by fiscal crises, many countries in eastern and southern Africa since the early 1990s have initiated erratic transitions from controlled food marketing systems to dual systems in which the government and private sector both operate directly in food markets. There is an emerging consensus that the *status quo* food marketing situation in most African countries is not going to catalyze small farm productivity growth, and that new approaches will need to be found quickly. This paper addresses nine major issues to guide future discussions on alternative food marketing and trade policy options in the region: (1) how historical and political factors constrain the feasible set of agricultural marketing and trade policy options in many countries of the region; (2) how public expenditure patterns have exacerbated the policy dilemmas associated with underdeveloped food markets; (3) how governments can make the demand for staple food more elastic and hence mitigate the price instability problem; (4) the implications of both eastern and southern Africa's transition toward structural grain deficits; (5) how the emerging bio-fuels industry and other world market changes will affect import parity prices in the region; (6) why a relatively small proportion of smallholder farmers will be able to benefit from the likely rise in regional food prices; (7) why much of the rapid growth in urban food demand is being met by food imported from outside the region; (8) how the rise of cassava production is likely to affect grain price stability; and (9) the importance of understanding the implementation details in empirical analysis attempting to link alternative policy choices to outcomes.

---

[*] Professor, International Development, Department of Agricultural Economics, Michigan State University, on assignment at FAO Headquarters, 2006/07. [**]Professor, International Development, Michigan State University, affiliated with the Ministry of Agriculture/Agricultural Consultative Forum/MATEP Food Security Research Project, Lusaka Zambia.

GRAIN MARKETING POLICY AT THE CROSSROADS: CHALLENGES FOR EASTERN AND SOUTHERN AFRICA

Introduction

Broad-based agricultural productivity growth is understood to be a pre-condition for sustainable poverty reduction and improved living standards in most of sub-Saharan Africa. On the surface, the challenge of raising farm productivity could appear to be a difficult but at least relatively straightforward one: use the power of crop science to generate improved farm technologies, put them into small farmers' hands, and provide them with the knowledge to get the most out of these technologies. Over the past several decades, several highly committed and well-funded efforts to kick-start "green revolutions" in Africa have been thwarted by their inability to anticipate and address downstream issues of marketing and governance. For example, the Sasakawa/Global-2000 programs have demonstrated that it is indeed possible to give improved seed and fertilizer to farmers and provide them with management advice, and that this can temporarily generate impressive yield gains by small farmers. But once the program withdraws, the hard questions arise: how will farmers continue to acquire the improved seed and fertilizer? Who will supply these critical inputs to them? Who will supply the credit to enable the poorest households to afford these inputs? Who will buy the crop at a decent price, especially if aggregate supply expansion depresses prices in the market? Who will be responsible for system-wide coordination of the food value chains, to ensure that the important public and private investments are made to effectively link farmers to the wholesalers, processors, retailers and ultimately the consumer?

Over the past several decades, the role of output markets in supporting grain productivity growth has become widely recognized, and various approaches have been tried. Such efforts have involved i) state-led approaches to stabilize prices and integrate input delivery, farm credit and output markets through controlled marketing systems; and ii) ostensible attempts to transfer critical marketing functions from the state to private traders, which in most cases have been marred by a lack of trust, cooperation and coordination between the private and public sectors. Neither of these approaches has produced sustainable farm productivity growth. There is an emerging consensus that the *status quo* food marketing situation in most African countries is not going to catalyze small farm productivity growth, and that new approaches will need to be found quickly. Population growth without income growth is exacerbating poverty and causing more frequent and severe food crises. There is indeed an urgency to the challenge of making staple food markets work for small farmers.

While there are many theories that may contribute to a systematic assessment of policy options – e.g., the theory of the 2nd best – in the end, the mix of marketing and trade policies most likely to achieve national policy objectives in the region is fundamentally an empirical question. The study of on-the-ground experience, linking policy choices and implementation modalities to outcomes can help us learn what has worked, what hasn't, and why. Political economy factors, ubiquitous in virtually all countries of the world,

often create consequences that cannot be predicted on the basis of ahistorical and apolitical theories.

This paper identifies major challenges and underlying trends affecting the food sectors in the eastern and southern Africa region. These issues are intended to set the context and parameters for discussions of alternative food marketing and trade policy options in the eastern and southern Africa region. We address the following nine issues that are likely to fundamentally affect the outcomes and distributional effects of alternative food marketing and trade policies: (1) how historical and political factors constrain the feasible set of agricultural marketing and trade policy options in many countries of the region; (2) why the longstanding under-investment in market-facilitating public goods have exacerbated the policy dilemmas associated with underdeveloped food markets;; (3) how governments can make the demand for staple food more elastic and hence mitigate the price instability problem; (4) the implications of both eastern and southern Africa's transition toward structural grain deficits; (5) how the emerging bio-fuels industry and other world market changes will affect import parity prices in the region; (6) why a relatively small proportion of smallholder farmers will be able to benefit from the likely rise in regional food prices; (7) why much of the rapid growth in urban food demand is being met by food imported from outside the region; (8) how the rise of cassava production is likely to affect grain price stability; and (9) the importance of understanding the implementation details in empirical analysis attempting to link alternative policy choices to outcomes.

Most of our review focuses on the staple grain sectors of eastern and southern Africa, especially the countries where "green revolutions" briefly flourished in the 1970s and 1980s before stalling out. The vast majority of the evidence-based analysis of output marketing to support small farmers' use of hybrid seed and fertilizer technologies is in the eastern and southern African countries where some progress has (or had) been achieved: Kenya, Malawi, Zambia, and Zimbabwe (and to a lesser extent, Tanzania).

1. Historical and political factors shaping food marketing and trade policy options

Understanding the scope for alternative trade policy options in the region requires an understanding of (a) the historical role of food policy in the post-independence "social contract" between states and their constituents, and (b) the increasing politicization of food policy.

The "social contract"

White maize is 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). The controlled marketing systems inherited by the new governments at independence were viewed as the ideal vehicle to implement these objectives. The benefits of market

controls designed to produce rents for European farmers during the colonial period instilled the belief that the same system could also promote the welfare of millions of smallholders if it were simply expanded (Jenkins 1997).[2] The social contract also incorporated the understanding that governments were responsible for ensuring cheap food for the urban population. While this approach achieved varying levels of success in promoting smallholder incomes and consumer welfare, a common result in all cases was an unsustainable drain on the treasury.[3] The cost of supporting smallholder production -- through input subsidies, credit programs with low repayment rates, commodity pricing policies that subsidized transport costs for smallholders in remote areas, and the export of surpluses at a loss -- contributed to fiscal deficits and in some cases, macroeconomic instability. Under increasing budget pressure, international lenders gained leverage over domestic agricultural policy starting in the 1980s, which culminated in structural adjustment programs in each country (Jayne and Jones 1997). While structural adjustment is commonly understood to be a decision that international lenders imposed on African governments, a more accurate characterization of the process is that some sort of adjustment was unavoidable due to the mounting fiscal crises that the social contract policies were imposing on governments. Continuation of the status quo policies was not an option in countries such as Malawi, Tanzania, Zambia, Zimbabwe, and Kenya, and in some of these countries, the controlled marketing systems had already broken down prior to "market liberalization" as parallel markets swiftly became the preferred channel for most farmers and consumers.

However, the rise of multi-party electoral processes in the early 1990s (which largely coincided with the structural adjustment) has made it difficult for governments in these countries to withdraw from the "social contract" policies. Elections can be won or lost through policy tools to reward some farmers with higher prices and reward others with lower prices, and this is hardly unique to developing countries (Bates, 1981; Bates and Krueger, 1993; Bratton and Mattes, 2003; Sahley *et al*., 2005). Because they provided obvious demonstrations of support for millions of small farmers and consumers, a retreat from the social contract policies exposed leaders to attack from opposition candidates (Sahley et al., 2005).[4] For this reason, it remains difficult for leaders to publicly embrace grain market and trade liberalization, even as they accepted structural adjustment loans under conditionality agreements from international donors to reform their internal and external markets. And starting in the late 1990s, the transition of the World Bank and

[2] For an analysis of how maize marketing and trade controls in the colonial period were used to support colonial settler farmers, often at the expense of African farmers, see Mosley (1975) for the case of Kenya; Keyter (1975) for Southern Rhodesia/Zimbabwe, and Jansen (1977) for Northern Rhodesia/Zambia.

[3] For example, in the early 1990s, the deficits of Zimbabwe's Grain Marketing Board's were 5% of GDP (Jenkins 1997). By the late 1980s, Zambia's subsidies to the maize sector reached 17% of the national budget (Howard and Mungoma 1997).

[4] President Frederick Chiluba adopted widespread food and input market reform programmes in the early 1990s, but based on charges that he deserted the small farmer, reintroduced major input subsidy programs by 1994 and created a new food marketing parastatal, the Food Reserve Agency, in 1996. Levy (2003) argues that Malawi's starter pack programme, featuring small amounts of free maize seed and fertilizer for almost every rural household in the country, "probably contributed to the re-election of President Bakili Muluzi in 1999."

other donors' from conditionality agreements to direct budget support made it easier for states to reinstate some elements of the social contract policies. By the early 2000s, grain marketing boards have once again become the dominant players in the market in Kenya, Malawi, Zambia, and Zimbabwe (Jayne et al., 2002). Each of these countries have a highly unpredictable and discretionary approach to grain trade policy, commonly imposing export and import bans and/or variable import tariffs, or issuing government tenders for the importation of subsidized grain.

2. Historical under-investment in public goods, leading to high marketing costs and wide swings between import and export parity.

Research has shown that high transaction costs and risks in developing countries inhibit the development of markets. However, the level of transaction costs and risks in any marketing system are endogenous – they are influenced greatly by public expenditure patterns and agricultural policy choices.

For example, a considerable part of the food price instability problem in the region is due to the high cost of transportation, which widens the price wedge between import and export parity prices throughout the region. During the 2005/06 food crisis in Zambia, the cost of importing grain from Johannesburg to Lusaka was $135 per ton, which added about 35% to the landed cost of grain in Lusaka. Public investments in transportation and communication infrastructure could significantly shrink the amplitude of price fluctuation between import and export parity.

Policy choices also affect transaction costs and risks. A common practice at border crossings is that trucks carrying maize are unloaded on one side of the border, carried across in bicycles one bag at a time, and re-loaded onto trucks on the other side of the border – all to evade import duties. While contributing very little to public revenue generation, these duties create costs for traders and raise marketing margins which are ultimately borne by farmers and/or consumers. While we are now learning that the magnitude of private cross-border trade is much higher than previously thought (WFP/FEWSNET, 2006), this has occurred in spite of considerable efforts to suppress it, and very little effort to invest in the physical market and communication infrastructure to nurture regional trade. Southern Mozambique is a notable exception to this pattern. Though officials have not promoted cross-border trade, they have permitted it to occur unhindered (Tschirley et al, 2006); this policy stance, plus the country's coastal status has allowed trade to stabilize prices in Maputo compared to other capital cities in the region (Chapoto and Jayne, forthcoming).

Other public goods investments that can promote the performance of domestic and regional trade are those that raise smallholder productivity, such as improved seed generation and other types of crop science, innovative extension programs to improve farmers' management practices, and the generation and dissemination of accurate crop production forecasts and price information. Unfortunately, in many countries, crop forecasts are notoriously unreliable. Zambia, for example, has lost its ability to estimate

maize production from the large-scale farming sector. This injects a great deal of guesswork into the food balance sheets that the government uses to estimate import requirements and/or export potential, which in turn increases the probability of undershooting or overshooting of trade volumes.

Thus, while transaction costs and risks are a ubiquitous feature of food markets in the region, they are not exogenous or inherent constraints. Both the productivity and stability of the food systems in the region could be substantially improved by public investments and policy change that reduce the costs within the staple food value chains.

If public goods investments are so important in improving the performance of strategically important food markets, then why has relatively small portions of government budgets been devoted to these investments? For example, during the past five years, 10% or less of the Government of Zambia's budget allocation to the agricultural sector has been devoted to crop science, extension services, irrigation, and other activities with clear public goods characteristics. Over 60% of the government's agricultural budget has consistently been spent on fertilizer subsidies and maize price stabilization operations (Govereh et al., 2006). In a recent article entitled "Under-investing in public goods: evidence, causes, and consequences for agricultural development, equity, and the environment," Lopez (2003) uses a political economy framework to show that unequal competition in the political lobby market causes the allocation of public expenditures to be biased in favor of private goods (such as input subsidies) that can be captured by politically influential groups and against the provision of public goods that would improve the overall performance of markets and thus have broad-based benefits for the poor. Other scholars describe the political landscape in much of Africa as being dominated by neo-patrimonial relationships, in which government commodity distribution is an important tool by which leaders maintain loyalty and patronage among rural leaders and their constituents (van de Walle, 2001; Bird, Booth, and Pratt, 2003; Pletcher, 2000). Even without resorting to neo-patrimonial arguments, it is clear that the next election compels policy makers' budget allocation decisions to be dominated by what can be achieved in the short run. Unfortunately, the payoffs from many public goods investments accumulate over the long run. The high food marketing costs and risks currently observed in the region reflect low investment in market-facilitating public goods in prior decades. The challenge is how to provide incentives to influence the public budget allocation process in favor of greater recurrent expenditures on public goods with demonstrably high social payoffs.

9. The Importance of Implementation Details in Evidence-based Research

The study of on-the-ground experience, linking policy choices and implementation modalities to outcomes can help us learn what has worked, what hasn't, and why. Unfortunately, some analysis assessing the impacts of alternative policies on outcomes has inadequately distinguished between stated policy pronouncements and actual on-the-ground implementation. In fact, the implementation of food market reform programs across Africa has been very heterogeneous. The impacts of reform on smallholder

production growth and price instability have naturally varied greatly according to how the reforms were designed and implemented (Chapoto and Jayne, forthcoming). Failure to adequately treat these distinctions in implementation has led to frequent mis-identification of policy impacts, providing misleading information to policy makers, and thus reducing the potential value of empirical research.

Despite the conventional perception that food markets have been "liberalized" (a very vague term indeed), many African governments, particularly in eastern and southern Africa have continued to intervene heavily in food markets throughout their reform processes (Toye, 1992; Jayne et al., 2002; Harrigan, 2003). These interventions have taken two main forms: (1) marketing board operations, and (2) discretionary trade policy instruments, such as variable export bans and import tariff rates. A defining feature of the marketing environment in the "liberalization period" in countries such as Kenya, Malawi, Tanzania, Zambia, and Zimbabwe has been the tremendous unpredictability and frequent change of direction in governments' role in the market. In this shifting policy environment, the private sector's response has naturally been muted, especially at the critical wholesaling stage (storage, linkages between farm assembly and wholesaling/processing stages, and long-distance trade, including regional trade).

Marketing Board Operations

Marketing board operations have generally been more modest in recent years than during the "pre-reform" period. However, marketing boards continue to be major actors in countries such as Kenya, Malawi, Zambia, and Zimbabwe. Using data provided by the national marketing boards between 1995 and 2004, the boards' annual purchases have fluctuated from an estimated 15-57 percent of the domestic marketed maize output in Kenya, 3-32 percent in Malawi, and 12-53 percent in Zambia (Jayne, Nijhoff, and Zulu, 2006). These figures understate the boards' full impact on markets because they do not count their often sizeable maize imports and subsequent release onto domestic markets. Because the boards are typically the largest single player in the market and often behave unpredictably, their operations can create major risks and trading losses for other actors in the market. In countries such as Zambia, Zimbabwe, and Kenya, the marketing boards' involvement appears to have risen in recent years, as the World Bank and some bilateral donors has shifted somewhat over the past decade from "conditionality" agreements to direct budget support of African states' treasuries.

Discretionary use of trade policy instruments

In addition to direct involvement in crop purchasing and sale at controlled prices, governments influence markets and marketing participants' behavior through discretionary trade policy instruments such as export bans, changes in import tariff rates, and government import programs.

Available evidence since 1990 indicates that governments' attempts to stabilize food prices in some cases has made food prices more stable (e.g., Kenya, see Jayne, Myers, and Nyoro, 2006) or, more often, more volatile (Rubey, 2004; Tschirley *et al*., 2006;

Nijhoff *et al*., 2003). The latter cases are exemplified by the Government of Malawi's response to an anticipated maize production shortfall in the 2001/02 season. Malawi faced a modest maize production deficit for its 2001 harvest, 8 percent below the country's 10-year mean. In September 2001, the grain trading parastatal, ADMARC, announced a fixed price for maize to be sold at its distribution centers and announced its intention to import maize from South Africa to defend this price (Rubey, 2004). Because ADMARC's selling price was considerably lower than the landed cost of importing maize, private traders had little incentive to import maize in this environment. However, the government imports arrived late and were not sufficient to meet demand. As a result, ADMARC depots began to experience stock-outs, and prices soared (Rubey, 2004). When it became clear that ADMARC's supplies were insufficient to last the full season, private traders scrambled to import, but for several months much of rural Malawi experienced grain shortages and prices were reportedly as high as $450 per ton in early 2002. The late-to-arrive ADMARC imports arrived during the good 2002 harvest. For financial reasons, ADMARC had to work down its stocks to free up resources, and these releases onto the market in a good production year produced 16 months of continuously declining maize prices, to the detriment of producers' incentives to intensify their maize production (Tschirley *et al*., 2006; Rubey, 2005). This case illustrates that well-intentioned but poorly implemented government actions can exacerbate food price instability rather than reduce it.

Similar problems arise due to uncertainty about when and whether governments will alter their import duties in response to a short crop. Traders that mobilize imports early face financial losses if the duty is later waived and competing firms (or the government parastatal) can import more cheaply. When governments create uncertainty over import tariff rates during a poor crop season, the result is commonly a temporary under-provision of imports, which can then result in shortages where local prices exceed import parity levels for periods of time (Nijhoff *et al*., 2003). Analysts not familiar with the details of these situations often erroneously interpret them as evidence that markets fail and that the private sector is weak, leading to a rationale for continued direct government involvement in marketing.

Since the early 1990s when the liberalization process began, the marketing boards in Malawi, Kenya, Zambia and Zimbabwe have frequently imported maize in volumes that are large compared to the size of the market, and sold at prices considerably below the cost of commercial importation. The expected return to private storage in this policy environment is considerably lower than what it would be if prices were allowed to fluctuate between import and export parity. This has impeded private investment in storage, particularly at the wholesale level. Because governments often attempt to truncate the distribution of food prices at both the upper and lower ends, stockholding is risky and there are no assurances that normal intra-seasonal price rises will occur due to the uncertainty over government action. 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.

Thus, two decades after market reform programs were initiated in eastern and southern Africa, maize marketing policies in many countries are fundamentally similar to the controlled marketing systems of their earlier histories. Many governments remain important players in their staple food markets, both through their direct procurement and sale operations and through their use of trade policy instruments. Though the quantities they trade are smaller than during the controlled market era, marketing boards in these countries still exert a dominant presence in the maize markets, handling between 10 to 50 percent of marketed volumes. Some aspects of policy change have been implemented, primarily the legalization of private trading, and marketing board operations have been downsized, primarily due to fiscal constraints. Instead of purchasing the entire marketed surplus, as was the goal during the former control period, these boards now attempt to influence market prices through their purchase and sale operations, ostensibly for food security and/or price stabilization purposes. Many countries in eastern and southern Africa have continued food price stabilization *cum* subsidy programs of various types, and hence an empirical assessment of these countries' market 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. There is a general consensus that this approach has largely failed to stabilize farm prices, provide adequate seasonal finance for small farmers' purchase of cash inputs, or stimulate private investment in the assembly and wholesaling stages of the value chain, and hence it has been unable to provide smallholders with the incentives to use improved farm technology in a sustainable manner.

Before leaving this section, we present trends in staple cereal production (Table 1) for these countries having continued to pursue direct price support and stabilization objectives (Kenya, Malawi, Zambia, and Zimbabwe) compared to cereal production trends for sub-Saharan Africa as a whole, and for three countries that have adopted a comparatively non-interventionist approach to grain markets (Mali, Mozambique, and Uganda). One obviously cannot attribute differences in national cereal production performance simply to the manner of government participation in food markets However, the data in Table 1 provide *prima facie* evidence that none of the four countries pursuing food price stabilization and food security objectives through direct state operations over the past decade have been able to match production growth for the continent as a whole. While cereal production in the Sub-Saharan Africa region as a whole has increased by roughly 60 percent over the past two decades, three of the four countries continuing to intervene heavily in their food markets are barely achieving cereal production levels of the 1980s. Ironically, these are the countries where the greatest advances in cereal seed technology have been made, and where green revolutions were believed to have been initiated in the 1970s and 1980s. By contrast, Mali, Mozambique and Uganda have all experienced a 90 percent or greater increase in cereal production

over the past two decades, despite having benefited much less from the technological contribution of improved seeds.

Table 1. Cereal Production Trends in Kenya, Malawi, Zambia, Zimbabwe, and Sub-Saharan Africa overall, 1985 to 2004.

	Sub-Saharan Africa	Kenya	Malawi	Zambia	Zimbabwe	Mali	Mozambique	Uganda
	Production indices (1985 = 100)							
1985	100	100	100	100	100	100	100	100
1986	106	115	96	110	90	99	111	90
1987	101	98	88	97	44	94	79	105
1988	119	113	105	172	92	126	78	120
1989	119	110	112	165	75	123	84	138
1990	112	93	99	103	76	102	99	133
1991	122	95	119	104	61	139	72	134
1992	117	97	47	53	13	105	33	148
1993	124	86	153	149	73	126	100	157
1994	129	126	78	102	80	142	108	161
1995	131	113	126	75	27	127	150	169
1996	146	94	139	134	91	134	183	132
1997	139	93	97	99	82	127	206	136
1998	146	102	136	70	55	153	226	174
1999	147	96	189	88	59	168	253	179
2000	140	89	187	91	73	142	211	173
2001	147	113	126	66	55	162	205	189
2002	145	97	124	65	22	152	216	194
2003	161	95	155	114	30	175	242	198
2004	159	95	131	114	35	169	263	217
2005	165	100	132	84	48	191	266	217

Source: FAOStat website: http://faostat.fao.org/

4. Making the demand for grain more elastic

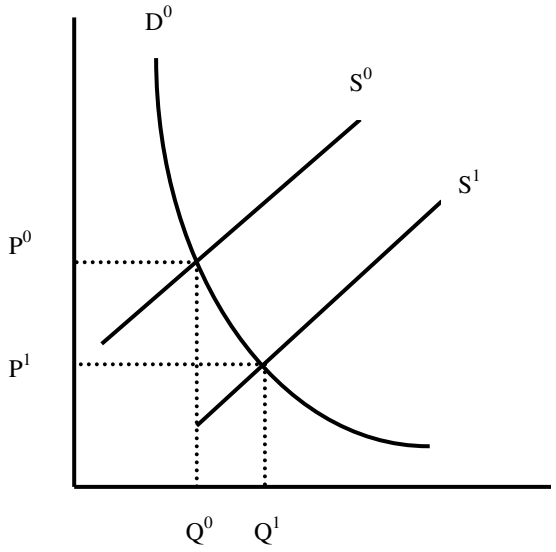
Price instability is major problem motivating governments to restrict trade flows. Crop production expansion is difficult to sustain in the face of highly inelastic product demand, which causes precipitous price plunges when local markets are unable to absorb surplus output. Such price drops are a major cause of subsequent farm dis-adoption of improved technology. Public policy can improve the ability of markets to support smallholder productivity growth by making the demand for grain more elastic.

Figures 1a to 1c shows this schematically. If farmers' initial adoption of productivity-enhancing technology causes the food supply curve to shift from S^0 to S^1, prices will drop

from P^0 to P^1 if markets are unable to absorb the surplus due to inelastic demand (D^0). The actual quantity supplied increases marginally from Q^0 to Q^1. In this environment, markets are not able to support sustainable farm technology improvements.

By contrast, Figure 6.2 shows a situation of elastic demand. When demand is elastic, greater quantities of product can be absorbed by the market without depressing prices. If the demand for grain were more elastic (as shown in Figure 6.2), the same expansion of the food supply curve from S^0 to S^1 would cause a much smaller reduction in farm prices, and a much greater ability to increase actual quantities supplied by farmers (Q^0 to Q^2). A major challenge of output market development, therefore, is to make the demand for staple food much more elastic. A related challenge is how to expand the demand for grain to maintain strong incentives for farmers, but in a way that does not price poor consumers out of the market.

Figure 1a—Supply expansion with inelastic demand



A third scenario, shown in Figure 1c, underscores the power of regional and international trade to stabilize food prices and support farm technology adoption. Figure 1c is similar to Figure 1b, except that the magnitude of potential price fluctuations is truncated by trade possibilities. If a country's markets can be well integrated with surrounding countries, then if prices drop to a certain level (P^3), the country's surplus production will become competitive in regional or international markets, providing a vent for surplus production at a level equal to the price in international markets minus transport costs (P^3). Likewise, if prices rise to a certain point (P^4), surpluses in other countries can be brought into the country at a cost equivalent to the price of grain in the surplus country plus transport costs (P^4). However, the theoretical price stabilizing effects of trade can only be realized in practice if markets work well, which depends on getting the incentives right for traders to operate.

Figure 1b—Supply Expansion with Elastic Demand

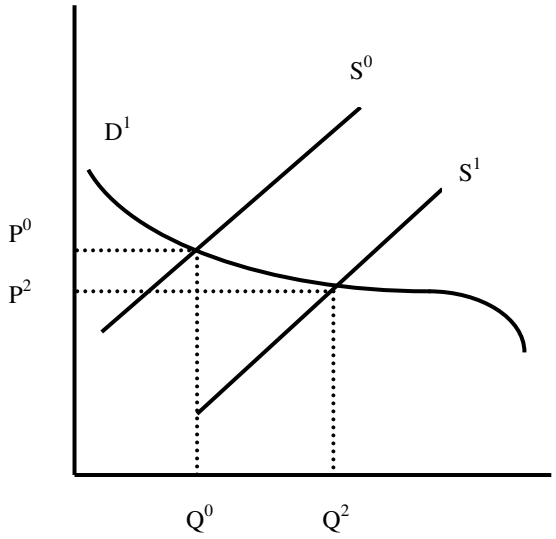
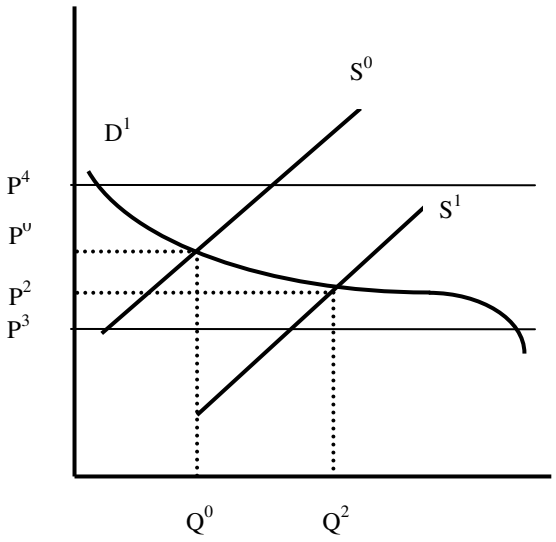


Figure 1c—Supply Expansion with Elastic Demand and Trade Linkages



Fortunately, it is possible to alter the shape of the demand curve that small farmers face. The demand for staple grain crops can be made more elastic, and shifted outward, through market-facilitating public investments and policy choices and by nurturing important marketing institutions.

i) Physical infrastructure: The size of the market is determined by marketing costs. Transport costs are generally a large component of price differences between surplus and deficit areas (Ahmed and Rustagi, 1984). As transport costs decline, the size of

the market expands for any particular farmer and demand becomes more elastic. This is analogous to the situation of a small country supplying product to the world market – the huge size of the world market relative to the small country's production makes the demand function that it faces perfectly elastic (flat).

ii) Regional trade: Regional trade, in combination with good transport infrastructure between countries, has the potential to expand the size of the market, increase the elasticity of demand facing farmers, and reduce price instability. For non-tradable commodities where price shocks are mainly generated by domestic events such as weather, the magnitude of the shock will largely determine the variability of domestic production. But local production shocks can be mitigated by regional trade, which tend to stabilize markets by linking together areas with covariate production (Koester, 1986). The size of a country matters -- larger countries typically have more diverse regional climatic conditions that reduce systemic risks at the country level.

iii) Streamlining regulations and trade barriers: Many African countries impose import tariffs on staple foods coming from neighboring countries. Other countries frequently resort to export bans. These trade barriers often vary unpredictably, and so make it risky for trading firms to invest in developing durable marketing networks across regions. Customs clearance procedures are often cumbersome. For example, permits to legally import grain into Kenya are available only in Nairobi (Nyameino, Kagira, and Njukia, 2003). Traders wanting to move product from N. Mozambique to southern Malawi need to get export permit in Quelimane (Tschirley, Abdula, and Weber, 2005). These regulatory barriers impose transaction costs on traders which results in lower demand and lower prices for farmers (and higher prices for consumers). Streamlining the regulatory processes for regional trade can reduce downside price instability that often depresses farmer incentives to sustain their use of productivity-enhancing cash inputs.

iv) Rural financial markets to improve traders' capacity to absorb surplus production: While the importance of small farmer credit in promoting the uptake of improved farm technology is well recognized, the role of trader finance is also crucial. A major source of inelastic demand in traditional food markets is the constrained supply of trader finance (Coulter and Shepherd,1995). Market institutions such as warehouse receipt systems can inject needed liquidity into grain marketing systems and thus allow the system to better absorb surplus production in good years. But the development of these market institutions will depend on supportive government policies. So far, fledgling attempts to develop warehouse receipt systems and other innovative sources of trader finance in staple food assembly and wholesaling markets (e.g., Ghana and Zambia) have floundered due to direct government operations in markets that have been incompatible with the development of these institutions (Coulter, 2006).

v) Diversification of food consumption patterns: When food consumption patterns become more diversified, markets become more interlinked and stable than in cases where one commodity dominates food consumption patterns. Especially in eastern and southern Africa, food production and consumption patterns have changed markedly over the past decade. The former dominance of white maize has given way to more diversified food systems. In many rural areas of Malawi, Zambia, and

Tanzania, cassava cultivation has increased dramatically. 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 (Nweke, Spencer, and Lynam, 2002). 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.

vi) Generating alternative sources of demand for grain: It is likely that food and energy markets will become increasingly integrated in the future with the development of the bio-fuels industry. A local bio-fuels industry could become an important means of stabilizing downside price risk for small farmers, by offering a floor price in periods of excess supply. This would essentially make the demand for grain perfectly elastic at a certain floor price. The rise of a local bio-fuels industry will also create greater interplay between sugar and grain markets over time, which will also contribute to price stability and less variable demand for smallholder staple crops.

viii) Development of world food markets: Increase the world supply and trade in white maize: Until recently, the world market for white maize was thinly traded and hence small absolute changes in import demand in Southern Africa had the potential to influence world prices. The rationale for some level of stockholding is more compelling in such cases. However, in recent years, the white maize market has become much more heavily traded due to the effect of North American Free Trade Agreement (NAFTA), which, since 1997, has induced a large white maize supply response in the USA to export to Mexico. These developments have mitigated the potential for white maize prices and supplies to become tight when the Southern Africa region experiences a drought, and thus reduces the rationale for keeping large government stockpiles of white maize to stabilize supplies (Tschirley et. al., 2004).

5. Gradual movement of region to structural cereal deficit[5]

Both the eastern and southern Africa regions are moving towards structural maize deficit. This conclusion is based on trend analysis of net export data (the difference between total exports and imports) of maize grain and meal. Although FAO trade data do not capture unrecorded trade flows between countries, the net impact on regional net exports is virtually zero, since each bag of unrecorded cross-border exports from one country in the region is imported by another country in the region. For the purposes of this paper, the southern Africa region consists of Zambia, Zimbabwe, Mozambique, South Africa, Botswana, Namibia, Lesotho, Swaziland and Malawi. East Africa includes Kenya, Uganda, Tanzania, Rwanda, Democratic Republic of Congo, and Ethiopia.

We regressed regional and country-specific net export data on linear time trends, and on models allowing for shifts in the slope of the trend between the 1960-1981 and 1982-2005 periods. Net exports regressed on a linear time trend in both regions show statistically significant downward slopes. Net maize (grain plus meal) exports in the

[5] This section draws heavily on Jayne and Chapoto (2006).

southern Africa region declined at a rate of -72,201 metric tons per year for the period 1960-2005. Net maize exports over the same period in east Africa declined at the rate of -9,798 metric tons per year (Figure 2). There is no significant difference in the trend in net exports in eastern Africa between 1960-1981 and 1982-2005. Net exports in southern Africa increased by 85,544 metric tons per year for the period 1960-1980 and then declined by 94,586 metric tons per year during the period 1981-2005 (Figure 3).

Figure 2: Net exports of maize grain and maize meal in east Africa

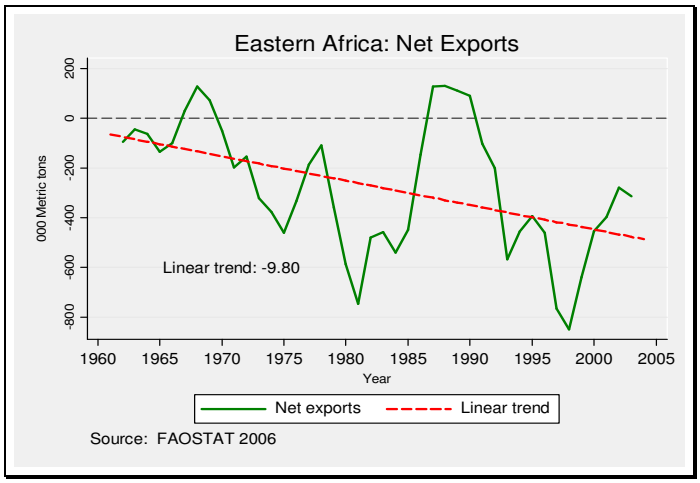
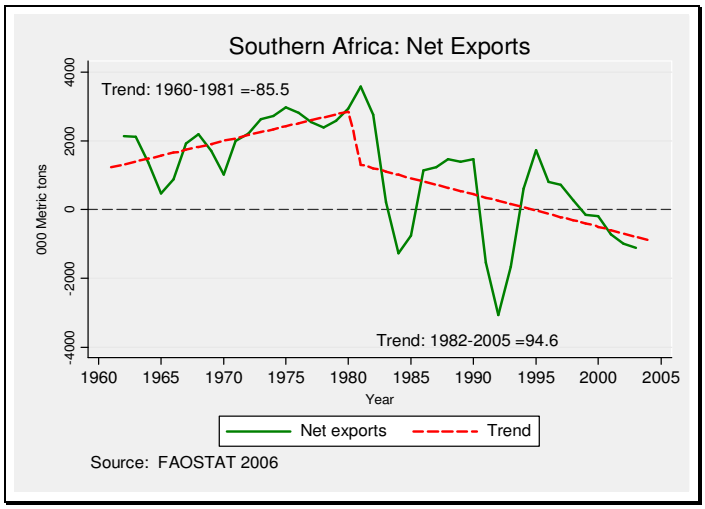


Figure 3. Net exports of maize grain and maize meal in southern Africa



At the country-level, there was a downward trend in net maize exports in all countries of southern Africa, with all of these being statistically significant at the 5% level. In east Africa, there was a significant downward trend in net maize exports for 2 of 6 of the east African countries (Kenya and Rwanda), while for Ethiopia the trend is positive and

significant. The trend is weakly negative in Tanzania and weakly positive in DRC. Kenya, Malawi and Zimbabwe, all net exporters of maize in the 1970s and 1980s, are now chronic importers. The reduction of maize production subsidies in South Africa has also reduced the exportable surplus in that country, although it remains a reliable exporter.

In recent years, and especially after the inception of political turmoil in Zimbabwe in the late 1990s, South Africa has become the only reliable exporter of white maize in the region. Areas of Mozambique, Zambia, and Malawi typically produce maize surpluses, but these surpluses are usually depleted halfway through the marketing year. Informal trade flows from Zambia to the DRC, and from northern Mozambique into Malawi, appear to be substantial in some years, despite frequent official efforts to suppress these flows or tax them heavily.

6. Import parity prices for grains are likely to rise, at least in the medium run

The emergence of the bio-fuels market and China as a growing world food importer are both likely to push world food grain prices higher in the coming years. It is likely that food markets will be increasingly integrated with sugar and crude oil markets because they are all becoming partial substitutes in the demand for fuel. The rapid investment in biofuels development in South Africa is likely to raise the price surface for grain in that country, which will in turn raise import parity prices in much of southern Africa. Higher import parity prices will bring important challenges for protecting millions of low-income consumers during drought years, and may change the costs and benefits of alternative food supply stabilization approaches. The projected long-term rise in the price of crude oil is likely to affect fertilizer prices even more so than grain prices. Future climate change is also likely to cause more frequent supply shocks in various parts of the world, which may create greater instability in world food markets.

If import parity prices do rise over time and the price surface reaches import parity levels with increasing frequency (especially in southern Africa, which is transitioning to structural deficit at a rapid pace), these developments would re-introduce the importance of supply response: do most smallholder farmers have the resources to translate higher food prices into greater production? How can incentives be structured so as to better integrate smallholder farmers into the development of grain value chains, instead of allowing the current trend to continue whereby increasing food import demand is being primarily sourced from South Africa, international suppliers of wheat and rice, and food aid? Policy makers could greatly benefit from pro-actively incorporating these future challenges into policy and planning now so that they are anticipating rather than reacting to them *ex post.*

7. Supply response: Can smallholder farmers respond (in broad-based way) to higher prices?

Analysis of nationwide smallholder farm survey data in eastern and southern Africa highlights several consistent aspects of farm structure holding that are likely to impede supply responsiveness to price incentives. These "empirical regularities" include (1) declining land/labor ratios and high inequality of landholding distribution within the smallholder sectors; (2) high concentration of marketed maize and other crops; (3) the position of most rural households as purchasers of maize rather than sellers; and (4) the segmentation of "formal" and "informal" food marketing channels in the region.

Decline in land/labor ratios and inequitable land distribution

Relative to other areas of the developing world, Africa has been seen as a continent of ample land and scarce labor. While this was true decades ago and may still apply to some areas where smallholders leave arable land uncultivated due to lack of labor or draught power, it no longer applies to much of southern and eastern Africa. One of the most important trends in African agriculture is a steady decline in the land-to-person ratio. Between 1960 and 2000, according to FAO data, the amount of arable land under cultivation (including permanent crops) has risen marginally, but the population of households engaged in agriculture has tripled. This has caused a steady decline in the ratio of arable land to agricultural population (Table 2). In Kenya, Ethiopia, and Zambia, for example, this ratio is about half as large as it was in the 1960s.

Table 2. Ratio of Cultivated Land to Agricultural Population (10-year means)

	1960-69	1970-79	1980-89	1990-99
Ethiopia	0.508	0.450	0.363	0.252
Kenya	0.459	0.350	0.280	0.229
Mozambique	0.389	0.367	0.298	0.249
Rwanda	0.215	0.211	0.197	0.161
Zambia	1.367	1.073	0.896	0.779
Zimbabwe	0.726	0.664	0.583	0.525

Note: Land to person ratio = (land cultivated to annual and permanent crops) / (population in agriculture).
Source: FAOStat website: Source: FAO Stat database: www.faostat.fao.org/

In addition, the distribution of available land is highly inequitable. It is well-known that the colonial legacy has left much of Africa with severe land inequalities between smallholder, large-scale, and state farms. Redressing inequalities between these farm groupings is likely to be an important element of an effective rural poverty reduction strategy in countries such as Zimbabwe and Kenya. Perhaps less well-acknowledged is that there are major disparities in land distribution within the small farm sector itself. For example, landholding within the smallholder farm sector in eastern and southern Africa is

typically characterized as small but relatively "unimodal," equitably distributed, and situated within a "bi-modal" distribution of land between large-scale and small-scale farming sectors. By contrast, Jayne et al (2003) found consistently large disparities in land distribution within the small farm sector using national household survey data in Ethiopia, Kenya, Malawi, Mozambique, Rwanda, and Zambia (Table3). While average land holdings in the small farm sector range from between 2.5 and 3.0 hectares in Kenya and Zambia to around one hectare in Rwanda and Ethiopia, these mean farm size values mask great variation.

Table 3. Mean Attributes by Household Landholding Size Per Capita, Various African Countries

Country (survey year)	Household Attribute	Total sample	Means for household quartiles ranked by per capita farm size			
			1	2	3	4
Kenya	Landholding size per capita (ha)	0.33	0.08	0.17	0.30	0.76
2000	Landholding size (ha)	1.77	0.64	1.18	1.84	3.45
	Gross value of crop sales (2000 US$ per hh)	1,067	485	751	1,420	1,612
	Household income (2000 US$ per capita)	553.9	272.6	379.4	568.2	998.4
	Off-farm income share (%)	30.5	37.3	27.7	29.2	27.9
Ethiopia	Landholding size per capita (ha)	0.24	0.03	0.12	0.22	0.58
1996	Landholding size (ha)	1.17	0.20	0.67	1.15	2.58
	Gross value of crop sales (1996 US$)	145.8	33.7	82.3	120.6	265.2
	Household income (1996 US$ per capita)	71.6	53.1	52.1	88.3	91.0
	Off-farm income share (%)	8.1	13.7	9.0	5.4	4.6
Rwanda[a]	Landholding size per capita (ha)	0.16	0.02	0.06	0.13	0.43
2000	Landholding size (ha)	0.71	0.32	0.63	1.00	1.82
	Gross value of crop sales (1991 US$ per hh)	68.0	34.1	45.1	72.4	169.3
	Household income (1991 US$ per capita)	78.7	54.5	59.4	79.3	139.7
	Off-farm income share (%)	24.8	34.5	24.4	22.2	18.2
Mozambique	Landholding size per capita (ha)	0.41	0.09	0.22	0.37	0.96
2002	Landholding size (ha)	1.66	0.53	1.20	1.76	3.14
	Gross value of crop sales (2002 US$ per hh)	26.7	9.4	20.9	27.3	49.1
	Household income (2002 US$ per capita)	59.5	45.7	46.4	55.4	90.6
	Off-farm income share (%)	27.3	34.3	26.6	24.9	23.5
Zambia	Landholding size per capita (ha)	0.58	0.11	0.27	0.50	1.42
2000	Landholding size (ha)	2.73	0.74	1.60	2.75	5.81
	Gross value of crop sales (2000 US$ per hh)	72.2	32.7	59.2	83.6	113.4
	Per capita income (2000 US$ per capita)	122.3	107.5	107.0	115.6	159.2
	Off-farm income share (%)	28.5	39.7	26.9	25.0	22.2

Source: Compiled from data in Jayne et al. 2003.

Notes: Samples include only agricultural households defined as households growing some crops or raising animals during the survey year. All numbers are weighted except Kenya. Income figures include gross income derived from crop production on rented land. [a] For Rwanda: data is not available for land loaned out, only data on rented land is included.

For example, after ranking all smallholders by household per capita land size, and dividing them into four equal quartiles, households in the highest per capita land quartile controlled between five to 15 times more land than households in the lowest quartile (Table 3). In Kenya, for example, mean farm size for the top and bottom land quartiles were 6.69 and 0.58 hectares, respectively, including rented land. The range of computed Gini coefficients of rural household land per capita (0.50 to 0.56) from these surveys show land disparities within the smallholder sectors of these countries that are comparable to or higher than those estimated for much of Asia during the 1960s and 1970s (Haggblade and Hazell 1988). If the large-scale and/or state farming sectors in our case countries were included, the inequality of landholdings would rise even further.

An additional problem is the extremely low absolute level of landholding/capita among some households. In each country, the bottom 15-20 percent of small-scale farm households are approaching landlessness, controlling less than 0.5 hectares. In Ethiopia and Rwanda, the bottom land quartile controlled less than 0.20 and 0.32 hectares per capita. In Malawi, 80 percent of all smallholder households possess less than one hectare of land (Chirwa, 2006).

Both the inequality of land access and the low absolute levels of land/capita of some households are problematic for poverty reduction and growth for several reasons. First, there is a strong relationship between access to land and household income in southern and eastern Africa, particularly for farm sizes below 1 hectare per capita (Jayne et al, 2003). Mean total household incomes of the top land quartile are double those of the bottom quartile (Table 3). This relationship appears to be driven by limited access of land-poor households to lucrative non-farm income opportunities and higher-value crop or livestock markets (Jayne et al, 2003). Second, it is generally accepted that "pro-poor" agricultural growth is strongly associated with equitable asset distribution (Datt and Ravallion, 1998; Ravallion and Datt, 2002), yet surprisingly little attention has been devoted to considering the implications of land inequality in poverty reduction strategies.

Concentration of Farm Sales of Maize and Other Crops

One potential pathway out of poverty for smallholders with limited landholding is to earn greater returns per unit of land by diversifying into higher-value crops and animal products. There is some evidence that this is occurring. Yet, in general, the descriptive evidence shown in Table 3 suggests that many land-poor smallholders are not able to compensate for low land holdings through cultivation of higher-value crops, as crop sales income is strongly correlated with landholding size. Such opportunities are impeded by factors which raise the costs and/or risks of household staple food acquisition through markets (in addition to input and output marketing constraints common to small farmers). That is, the higher the price of food, and the greater the price variability during the lean season, the greater are household incentives to revert to self-provisioning of food staples (Fafchamps, 1992; Jayne, 1994; Omamo, 1998). Thus, diversification into higher-value crops is most likely to occur in densely populated rural areas and peri-urban areas, where high population pressure results in low land/labor ratios, food markets are more likely

integrated with nearby urban markets, and demand for horticultural crops and animal products is high.

Concentration of maize sales and household position in maize/maize meal markets

Because maize is not only a major staple in many regions of eastern and southern Africa but also a cash crop, we might expect smallholders to more readily commercialize a crop which is both consumed and marketed. Yet, the evidence below suggests that the combination of inequitable land access and large variations in crop productivity across households and regions contribute to considerable heterogeneity with respect to smallholders' position in staple food markets (Table 4). For example, large representative rural household surveys in eastern and southern Africa -- where white maize is a staple food crop -- indicate that small-scale farm households generally fall into one of the following four categories with respect to the grain market:

1. sellers of staple grains: Roughly 20 to 35 percent of the smallholder farms sell maize in a given year. Of course this figure will rise in good harvest years and fall in a drought year. However, there are two sub-groups within this category:

- a very small group of relatively large and well-equipped smallholder farmers with 4 to 20 hectares of land, usually in the most favorable agro-ecological areas (about 1 to 4 percent of the total rural farm population), accounting for 50% of the marketed output from the smallholder sector. These farms tend to sell between 5 and 50 tons of maize per farm in a given year.
- a much larger group of smallholder farms (20 to 30 percent of the total rural farm population) selling much smaller quantities of grain, between 0.1 and 5 tons per farm. These households tend to be slightly better off than households that buy grain, but the differences are not very great in absolute terms.

These households, especially the larger smallholder farmers, clearly benefit from higher grain prices, and have tended to advocate for the continuation of marketing boards procuring their crop at fixed support prices. They may also benefit from mean-preserving food price stabilization, although the benefits associated with price stabilization are likely to be much smaller than the benefits derived from raising mean prices (Myers, 2005).

2. buyers of staple grains: these rural households generally make up 50-70 percent of the rural population, higher in drought years and lower in good production years. These households are generally poorer and have smaller farm sizes and asset holdings than the median rural household. They are directly hurt by higher mean grain prices.

3. households buying and selling grain within the same year: In all of the nationwide surveys, relatively few households both buy and sell maize.[6] Only about 5 to 15 percent of the rural population buys and sells maize in the same year. They comprise both

[6] This empirical regularity contrasts with the common notion that, because of lack of credit, farmers typically sell at harvest at low prices and buy back latter at higher prices.

relatively large farms that sell grain and buy back lesser amounts of processed meal, as well as relatively poor households that make distress sales of grain after harvest only to buy back larger later in the season. However, this latter sub-group typically comprises less than 10 percent of the rural farm population.

4. households neither buying nor selling maize: these households make up a small proportion of the rural population in areas where maize is the dominant staple crop. However, in parts of northern Zambia and Mozambique, cassava is the main staple. Because of this, a sizable fraction of the rural population at the national level is autarkic with respect to maize.

Table 4. Distribution of small-scale farm population according to their position in the staple grain market, selected countries.

Household category with respect to main staple grain:	Zambia (maize)	Mozambique (maize)	Kenya (maize)	Malawi (maize)	Ethiopia (maize and teff)
	---------- % of rural farm population ----------				
Sellers only:	19	13	18	5	13
top 50% of total sales*	2	2	2	1	2
bottom 50% of total sales**	17	11	16	4	11
Buyers only	33	51	55	na	60
Buy and sell (net buyers)	3	12***	7	na	13
Buy and sell (net sellers)	6		12	na	12
Neither buy nor sell	39	24	8	na	2
	100%	100%	100%	100%	100%

Notes: * after ranking all households by quantity sold, this row shows the percentage of households in the smallholder sector accounting for the first 50% of total maize sale; **percentage of households accounting for the other 50% of total maize sales. ***The survey in Mozambique was not able to ascertain quantities of maize purchased therefore whether these households are net buyers or net sellers in unknown.
Source: reproduced from Jayne, Nijhoff, and Zulu, (2006), who compiled the data from the following sources. Zambia: Central Statistical Office Supplement to the Post Harvest Survey, 2000/01 marketing year; includes small-scale (0.1-5 hectares) and medium-scale (5-20 hectare) farms, proportional to probability sampling. Kenya: Tegemeo Institute Household Survey, Egerton University, 1999/2000 season, nationwide sample. Mozambique: TIA Household Income Survey 2001/02 . Malawi: Chirwa (2006), based on analysis of nationwide Malawi Integrated Household Survey, 1997-98, Government of Malawi. Data on maize purchases is limited to a 3-day recall period hence computation of maize purchases for the marketing year is not possible. Ethiopia - Central Statistical Authority, Government of Ethiopia, Food Security Survey, 1995/96 season.

Staple grain sales can be highly concentrated among a relatively small number of large and commercialized farmers in the smallholder sector. Table 5 disaggregates smallholder households included in the nationwide surveys into three groups: 1) the largest smallholder sellers of maize who accounted for 50% of the marketed maize output; 2) the

remaining households that sold maize during the year who accounted for the other 50 percent of the marketed output, and 3) those households that sold no maize during the 12-month marketing season.

As shown in Table 5, one or two percent of the farms account for 50% of the overall marketed maize surplus from the smallholder sector. These farm households appear to enjoy substantially better living standards, in terms of asset holdings, crop income, and non-farm income, than the rest of the rural population. The relatively "elite" smallholder farmers had roughly 2 to 5 times as much land and productive assets as the non-selling households, 2 to 7 times as much total household income, and 3 to 8 times more gross revenue from the sale of all crops.

When a broader set of staples are aggregated together (maize, cassava, sweet potato, millet and sorghum) more than 55 percent of the sales of staples are still accounted for by 10 percent of the farmers with the largest sales. This concentration of surplus production and marketing by a relatively few farmers is one of the most important points to be borne in mind when thinking about the effects of policy instruments designed to alter the mean level of food prices.

These findings hold several important policy implications. First, maize producer price supports or stabilization policies that involve altering mean price levels over time (as they usually do), can have unanticipated income distributional effects that run counter to stated poverty alleviation goals. To the extent that the poor are net purchasers of staples such as maize, wheat, and rice, they are directly hurt by policies that raise prices of these commodities.[7] Mean-neutral forms of price stabilization would most likely avoid these adverse distributional effects, and would also help to promote diversification toward higher-valued crops by maize purchasing households (Fafchamps, 1992).

A second implication of the substantial differentiation within the smallholder farm sector is that the benefits of mean-raising food price stabilization policies are likely to be extremely concentrated. This was a major outcome of the price support and stabilization policies pursued during the pre-liberalization period. Jayne and Rukuni (1993), using data on maize purchases by Zimbabwe's Grain Marketing Board (GMB) between 1985/86 and 1991/92, found that 1 percent of the nation's smallholder households accounted for 44 percent of all the maize delivered to the Board by smallholder farmers. These 9,000 households sold an average of 28.2 tons per year to the Board. Another 80,000 households (the next 9 percent of smallholder households in terms of maize sales) sold an average of 3.4 tons, accounting for 26 percent of the smallholder sector's maize deliveries to the GMB. Of the remaining 800,000 smallholder households in the country, only 24,000 sold any maize, and those that did so accounted for 4 percent of the total maize delivered to the GMB by the smallholder sector. Of course, the total smallholder sector of 900,000 households received only 54 percent of the government outlays on maize purchases over this 7 year period, as 4,000 large-scale farmers received the rest.

[7] Of course, a general equilibrium approach, taking into account indirect effects on welfare through labor market effects, would need to be undertaken before the welfare effects of mean-altering price policies could be fully understood.

Table 5. Characteristics of smallholder farmers classified by participation in the maize market, Zambia (2000/01), Mozambique (2002/03), and Kenya (1999/00).

	Maize sellers		Households not selling maize
	Farms accounting for top 50 percent of total maize sales	Rest of maize sellers	
	(1)	(2)	(3)
Number of households			
Zambia (weighted)	23,680 (2.2%)	234,988 (23%)	762,526 (75%)
Mozambique (weighted)	4,654 (1.0%)	654,771 (15%)	2,466,572 (83%)
Kenya (unweighted)	25 (1.7%)	535 (37%)	897 (61%)
	---------- Mean values ----------		
Land holding size (hectares)			
Zambia	6.00	3.91	2.79
Mozambique	3.46	1.70	1.60
Kenya	11.09	2.77	1.56
Value of farm assets (USD)[a]			
Zambia	1,558	541	373
Mozambique	205	47	62
Kenya	6,168	1,107	617
Total household income (USD)			
Zambia	2,282	514	291
Mozambique	2159	315	328
Kenya	8,849	2,357	1,565
Total crop income (USD)			
Zambia	1,348	502	233
Mozambique	1247	176	114
Kenya	5,479	1,147	628
Gross revenue, crop sales (USD)			
Zambia	823	135	36
Mozambique	715	47	20
Kenya	5,318	831	419
Gross revenue, maize sales (USD)			
Zambia	690	74	0
Mozambique	509	20	0
Kenya	3,474	162	0

Notes: [a]livestock plus farm equipment except for Mozambique, which is livestock assets only.
Source: Supplemental Survey to the 1999/00 Post-Harvest Survey, Central Statistical Office, Lusaka, 2001. [b] because the distribution of off-farm income is highly skewed, the reader is advised not to compute the share of off-farm income by using the mean off-farm income divided by mean total income.

A final implication is that strategies to link African farmers to markets must take account of the inequality in productive assets and low crop productivity, which contribute to highly concentrated patterns of agricultural surplus generation within the smallholder sector, and to the constraints on household diversification into higher-value crop production imposed by food market instability.

Given that government resources are scarce, policies to raise maize price levels have an opportunity cost, and these costs would need to be weighed carefully against the anticipated payoffs from other public investments. Unfortunately little empirical evidence exists (that we know of) that assesses the cost-effectiveness of price stabilization in Africa vs. other approaches to achieve the same productivity growth and food security objectives, such as investing in transportation infrastructure to reduce the costs of input delivery and output marketing, seed research and extension services to raise the marginal value product of using fertilizer, basic education, and the like. However, in light of patterns of concentration of marketed surplus presented in the previous section, there are strong reasons to believe that expenditures on the development and dissemination of agricultural technology, farmer organizations, credit for small farms, policies to raise smallholders' access to land, and market infrastructure would more directly benefit smallholder farmers in the bottom half of the income distribution and contribute more to rural poverty reduction objectives than output price supports (Hazell, 2003). Implementing this broader agenda of public investments to support pro-poor agricultural growth will, by themselves, stretch government and donor resources to the limit. But, as Hazell warns, the future for small farms will depend on mobilizing the support for such investments. Thus, the question for state maize price stabilization or price support is not whether these policies can generate positive benefits, but rather whether such benefits could reasonably be expected to exceed the payoffs to alternative forms of using limited donor and government resources.

8. Demand is growing rapidly but African smallholders are not filling this demand.

A recent study by the FAO (2006) determined that of the $3.7 billion of cereals imported annually by African countries, only 5% of it is produced by African farmers. Between 1990-92 and 2002/04, cereal imports by sub-Saharan Africa has been rising at 3.6% per year. Almost all of the growing demand in the region is due to rising urban populations, which are growing at over 4% per year compared to less than 1% per year for rural populations. This highlights the importance of developing more effective systems for linking smallholder farmers to urban demand centers, so that consumers are relying on their rural counterparts for food rather than international sources. This brings us back to the importance of public goods investments to reduce the costs of domestic production and marketing.

There are also important trends toward more diversified food consumption patterns in urban areas. Recent urban consumption surveys in Nairobi, Maputo, and the Umtata area of eastern Cape, South Africa attest to the rising importance of wheat and rice products in food consumption patterns (Muyanga et al. 2005; Tschirley, Abdula and Weber, 2005;

Traub, 2005). In all three surveys, wheat and/or rice was the main staple expenditure item of urban consumers, although in Nairobi, the urban poor still spent more on maize products than any other staple. Maize is still the dominant food crop in most of the region, but the rising importance of other staples that are widely traded on world markets and consistently available at import parity levels will increasingly contribute to more stable food expenditure patterns over time. Moreover, increased diversification in food consumption patterns has likely diluted the "wage-good" effects of maize price fluctuations on the overall economy.

However, there are various reasons why maize will likely continue to enjoy strong demand in these countries. First, in more land-locked urban areas, as well as in rural areas, there remains a very high demand for maize relative to wheat and rice. For example, in central and northern Mozambique, expenditures on maize in rural areas remains 3-4 times that for wheat and rice combined, and in urban areas the ratio is 1-3 times. Second, although urbanization is increasing, rural areas in a country such as Mozambique will still support nearly half the country's population 20 years from now. Finally, as incomes increase and consumers demand more meat and dairy products, demand for maize feed grain will undoubtedly increase dramatically. Thus, while preferences appear to be shifting somewhat away from maize in some urban areas, it is difficult to determine the future demand for maize in these countries *a priori,* because they are importantly a function of government trade policies on imported rice and wheat, and on how actively governments are in improving the competitiveness of maize production for small farmers.

9. Segmentation between formal markets and informal food markets

The maize marketing systems in much of eastern and southern Africa appear to be increasingly segmented into two channels that are poorly coordinated with each other. On the one hand, we see *"formal"* marketing channels linking commercial farmers (mainly in South Africa) and international suppliers to large grain trading, processing, and retailing firms with subsidiary distribution networks throughout Southern Africa. This marketing system is characterized by:

- commodity exchanges, including futures and options markets, enabling farmers and marketing agents to reduce risks of current and future investments;
- a network of integrated silos, millers, and supermarket retailers, often with transnational firm ownership;
- market information accessible on a daily basis, some of which is public, and some which is proprietary, providing asymmetric information advantages for those willing to pay;
- large transaction volumes, which enables transaction costs to be spread over greater quantities traded, hence reducing per unit marketing costs;
- well-specified grades and standards to allow for remote contracting by commodity specification rather than by visual inspection;
- legal systems to accommodate more sophisticated contracting arrangements and

facilitation of contract disputes;
- organized lobbies representing firms widely perceived as having a legitimate interest and voice in the determination of regulations governing agricultural markets.

By contrast, the *"informal"* marketing systems in the region, on which most small-scale farmers rely, are generally characterized by:

- spot market transactions with weak mechanisms for market-based risk management;
- small percentages of production sold off the farm, resulting in relatively thin markets and high transaction costs per unit traded;
- weak road and communications infrastructure, resulting in high transportation costs;
- weak information systems for reporting local market conditions
- processing of maize, either at home by consumers, or by low-cost small-scale mills not integrated with other stages of the marketing system;
- limited coordination between input delivery, farm finance, and crop sale, resulting in part from poorly functioning input credit systems;
- Small businesses with relatively little political influence or voice in the determination of regulations governing the agricultural sector.

The future of the small-scale farming sector's ability to prosper from maize production and marketing will depend on strengthening the performance of the marketing system serving small-scale farmers, and on integrating the informal marketing system with the more developed "formal" marketing channels that are rapidly expanding in the region.[8] Meeting this market development challenge is crucial not only for small-scale farmers' as sellers, but also as purchasers of food.

Applied research in the region has shown the increasingly adverse impacts on rural and urban consumers' food insecurity resulting from the segmentation of these marketing channels. For example, the Zambian government has in the past frustrated private imports during food shortages by sending confusing signals to markets. During the 2001/02 food crisis in southern Africa, the government announced its intention to import 200,000 metric tons of maize grain to cover a national deficit, and to sell that grain at below market prices directly to a small number of large formal sector millers. Given this announcement, other potential private importers, including informal traders from Mozambique, held off (Mano, Isaacson, and Dardell, 2002). When government instead imported only 130,000 metric tons and did so very late in the season, prices rose steeply, since this amount was insufficient to meet demand (Nijhoff et al, 2002). Moreover, because grain was channeled only to large millers (rather than released onto informal public markets), consumers had to pay the high price of refined meal instead of being able to source grain in informal markets and mill it more cheaply through the network of

[8] Our premise is that while developing markets for higher-valued crops is crucial for improving smallholder income and food security, this approach should be viewed as a complement rather than an alternative to the development of reliable food marketing systems to serve smallholders. Research has shown that smallholders' ability to diversify into high-valued non-food crops depends crucially on the ability of food markets to ensure reliable supplies at tolerable prices (e.g., Omamo, 1998; Jayne 1994).

informal sector hammer mills.[9]

Another example of how informal marketing channels serving smallholder interests are disadvantaged by government behavior concerns the Malawian government's tendency to arrange imports through government contracts with South African suppliers. The sourcing of grain from South Africa and subsequent release onto local markets has frequently depressed the informal trade from Mozambique. Since Mozambican smallholder farmers are the source of informal market trade to southern Malawi, the Malawi government's preference for arranging imports through South Africa has almost certainly added greater risks and price instability for smallholders relying on informal markets for their incomes (Nijhoff et al., 2003).

While there is widespread acceptance of the need to make food markets work better for smallholders (including those who sell grain as well as those who are dependent on the market for their food requirements), policy makers and donors alike need a greater empirical understanding of the interplay between formal and informal markets and their implications for policies designed to stabilize markets and promote smallholder welfare.

10. The rise of cassava

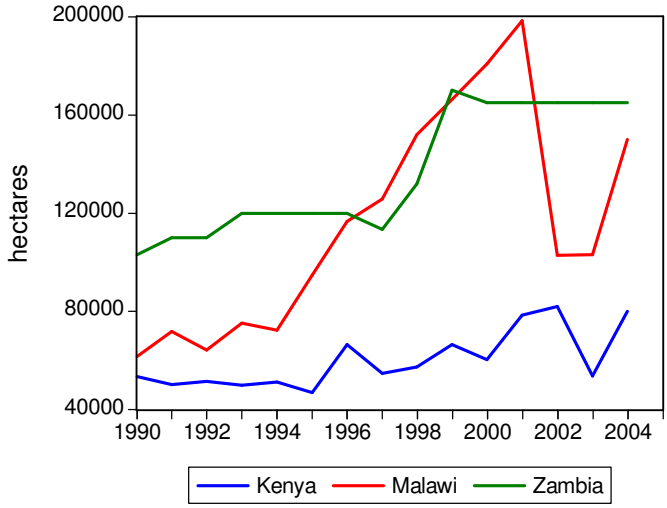
Food production and consumption patterns have changed markedly over the past decade. The former dominance of white maize has given way to more diversified food systems. In many rural areas of Malawi, Zambia, and Tanzania, cassava cultivation has increased dramatically (Figure 4).[10] The rise of cassava is not unrelated to maize policy. The elimination of pan-territorial maize pricing policies in early 1990s has reduced the profitability of surplus maize production in remote areas. Cassava production has risen substantially in many of these areas.

These shifts in production have apparently nurtured several highly productive, regularly surplus food production zones in the region. Even more flexible, and equally reliable as exporters of staple foods, are those ecosystems that combine the production of multiple staples, particularly cereals in combination with perennial foodcrops such as banana, cassava or root crops. These areas are generally characterized by favorable rainfall, areas that do not get too cold in the winter (cassava and banana do not grow well in cold conditions) and in watersheds where small-scale irrigation appears to be economical.

[9] Jayne et al (1996), studied the cost differences of refined maize meal supplied through formal sector channels and the less-refined meal available through hammer mills in informal markets in five countries in Southern Africa during the mid-1990s. They find that the hammer-milled meal could generally be obtained at 65-80% the cost of meal provided through formal sector outlets. However, when public markets become thinly traded and informal traders are not able to continue supplying these markets, consumers lose the option of hammer milled meal and have become reliant on the more expensive formal sector channels for their maize meal.

[10] OLS time trends showed annual increases of 1.9, 7.1, and 5.2 thousand hectares of cassava in Kenya, Malawi, and Zambia, respectively, with t-statistics of 3.74, 3.66, and 7.68.

Figure 4. Trends in Area to Cassava, Kenya, Malawi, and Zambia, 1985-2004.



Source: FAOStat, December 2005

Examples of these "stable food basket zones" include: Northern Mozambique, where cassava and potatoes provide local food security, enabling regular maize exports; most of Tanzania, where a blend of rice, cassava, banana and maize enable regular cereal exports both north into Kenya and south into Malawi; Northern Zambia, where cassava ensures local food security, even in drought years, enabling the region to export maize to DRC, Malawi and elsewhere in Zambia; and Uganda, where banana and cassava ensure food security, thereby enabling maize export to chronically deficit Kenya (Haggblade, 2006).[11]

Because farmers can harvest perennial foodcrops such as banana and 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. In drought years, when most maize-dominated zones face shortfalls, farmers from neighboring are able to harvest more of their perennial reserve crops (cassava or bananas) and in turn free up more cereals (primarily maize) for export to deficit zones (Haggblade, 2006).

It appears that these built-in shock absorbers serve a valuable role in moderating regional food shortages. Future analysis by Michigan State University, COMESA, and local collaborators is underway to test this hypothesis empirically. Another hypothesis is that in order to maintain and sustain producer incentives, farmers in the "stable food basket zones" need access to growing markets, both internal and across national boundaries. Successful expansion of regional trade has long been understood as a means to improve prices for farmers in surplus areas, dampen price spikes in deficit zones and diminish

[11] Policy-induced shifts in cropping patterns from maize to cassava and other food crops are apparent in Northern Zambia and parts of Tanzania. However, Uganda and most of Tanzania have historically had highly diversified food production patterns.

hunger (e.g., Koester, 1986). Failure to allow regional trade in food staples risks stalling production growth and investment in agriculture.

11. Conclusions

Driven mostly by fiscal crises, many countries in eastern and southern Africa since the early 1990s have initiated erratic transitions from controlled food marketing systems to dual systems in which the government and private sector both operate directly in food markets. 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 (Dorward et al., 2004). Food price instability is frequently identified as one of the major impediments to smallholder productivity growth and food security (Pinckney, 1993; Gabre-Madhin, Barrett, and Dorosh, 2003). Uncertain output prices coupled with risk-averse farmer behavior depresses incentive to adopt cash inputs. Moreover, several countries have been unable to prevent food prices from exceeding import parity levels in certain years, precipitating extensive hunger. Redressing these instability-related causes of low productivity and food insecurity are major challenges facing African policy makers.

The question of how to reduce food price risks and uncertainty quickly brings us to the role of the state and private sector in markets. A large literature has diagnosed the limitations of past government and market-led efforts to stabilize food prices (Jayne and Jones, 1997; Meerman, 1997; Barrett, 1999; Kherallah et al., 2002; Gabre-Madhin, Barrett, and Dorosh, 2003). Attempts at market reform in most of eastern and southern Africa have been partial and subject to reversals. State marketing boards have continued to play a major role in many countries' food markets through the reform process. There is an emerging consensus that the status quo food marketing and trade environment in most African countries is not going to catalyze small farm productivity growth, and that new approaches will need to be found quickly. Population growth without income growth is exacerbating poverty and causing more frequent and severe food crises. There is indeed an urgency to the challenge of making staple food markets work for small farmers.

A complicating factor in supporting the development of food marketing systems to promote small farmer productivity growth is that food markets are politically sensitive. The issue of how to stabilize food markets is transcended by issues of governance. The transition to multi-party electoral processes over the past decade may have intensified the politicized nature of food prices in some cases as political parties compete to show how they will deliver benefits to the public in times of need (Toye, 1992; Sahley et al., 2005). This kind of environment, in which political struggles are played out in food marketing and trade policies, create major challenges for developing a market environment that provides adequate scope and incentive for private trade. A comprehensive framework for addressing the challenge of making markets work better for smallholder farmers requires a political economy approach. A political economy approach is required to move beyond analysis that attributes failure to implement reforms and encourage market-based risk

transfer mechanisms to insufficient "political will". Likewise, a political economy approach is required to convincingly demonstrate how past failures of state intervention in markets can be overcome so as to address small farmers' real needs for sustainably using improved seed and fertilizer.

A major challenge is how to move away from a situation where leaders feel they have to be seen as "doing something" by 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 how to create constituencies for policies that are believed to promote market stability and small farm incentives to sustainably use improved seed and inputs, 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:

1. *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. Governments and private trading firms strategically interact in staple food markets – they respond to each others' actions and anticipated actions. Effective coordination between the private and public sector will require greater consultation and transparency between the private and public marketing agents (Brunetti, Kisunko, and Weder, 1997), especially 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 [strategic grain] 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 uncertain environment has clearly dampened the private sector's response to market reform in the region. Yet it is unlikely that a marketing system that provides sustainable and reliable access to credit, input and output markets can be put in place over the long run without the private sector being the major impetus behind it.

2. *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. Ameliorating market failure 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.[12] 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.

3. *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.

4. *Addressing the challenge of allocating a larger share of public expenditures for market-facilitating public goods:* As indicated in Section 2, politicians may understandably prioritize expenditures with short-term time horizons, which may then result in an underprovision of public goods investments that provide for a more competitive and efficient marketing system over the long run. One possible innovation worth exploring would be for donor and Bank financial aid to be increasingly based on "matching" funds for particular kinds of investments, i.e., for every $1 that the government spends on X, a donor would commit to contributing $2 for that investment.

Beginning in 2001, maize grain prices in all the countries examined here have generally moved above the Randfontein South Africa price. Coupled with the region's movement toward structural maize deficits, these findings suggest that much of the region is increasingly moving toward an import parity pricing situation *vis a vis* South Africa. However, small farmers' ability to benefit from rising prices in the capital cities will be constrained, once again, by poor market infrastructure and by uncertain government policies that make it risky for trading firms to invest in rural assembly, wholesaling, and cross-border trade.

Smallholder supply response is also constrained by farm structure: over half of the small farms in the region are less than one hectare in size. One-quarter of the farms are less than 0.5 hectares in size (Jayne et al, 2003). These farms cannot earn a decent income through a maize commercialization strategy unless there is tremendous growth in maize productivity, which will require sustained and dedicated investment in crop science and extension.

[12] For evidence of the payoffs to these public goods investments and their contribution to agricultural market performance, see Johnston and Kilby, 1975; Mellor, 1976; Binswanger, Khandkur, and Rosenzweig, 1993; and Huffman and Evenson, 1993).

There is limited potential for area expansion in most of the region, especially in the fertile zones. Hence, without land redistribution and/or substantial maize productivity growth, the gradual movement toward smaller farm sizes will compel households to adopt more diversified commercialization strategies capable of maximizing the value of output per scarce unit of land. In highly land-constrained areas, it should not be surprising to find households shifting out of relatively low-value maize toward horticulture, tobacco, cotton, and niche crops, and then using the revenue to buy their staple food needs. Thus, the trend toward structural maize deficits is not necessarily a bad omen for the region if small farmers can shift into other activities that provide higher incomes. There is evidence to suggest that this is already happening at least for a sub-set of smallholder farmers in the region.

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 (e.g., Kenya's North Rift, parts of Southern and Central Provinces in Zambia, and Zimbabwe's Mashonaland maize belt). Given reasonable assumptions about the potential for future productivity gains, it is unlikely that maize will provide the net revenue on the millions of farms that are 0.5-1.0 hectares or smaller to generate substantial income growth, especially in the semi-arid areas.

Therefore, the finding that the eastern and southern Africa regions are moving into a structural maize deficit situation may be a logical consequence of population growth, land pressure, and diversification into other crops. Yet 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 for many small farmers in the region. But broad-based improvements in rural livelihoods and incomes will require productivity growth for other crops: oilseed crops, horticulture, animal products, and other food crops such as cassava.

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. 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.

An important component of reform programs should be on-the-ground monitoring of reform implementation and impact. Close monitoring in the field would provide the potential for quick feedback to policy makers regarding on-the-ground implementation of

reform policies and allow for mid-course corrections if activities are not conforming to expectations.

Real time monitoring would also make research more effective in addressing Omamo's "how" question. He argues that much policy research is not specific enough to guide policy makers in how to implement certain reforms. A better understanding of how reform policies are interpreted and carried out in practice would provide the data to identify what is working, what is not, and thus provide a more solid empirical foundation for identifying the need for mid-course corrections. On the ground monitoring also allows researchers to come more in contact with the marketing agents and farmers who are being directly affected by the reforms, thereby providing the potential for researchers to get market participants' suggestions on the "how" questions, e.g., how should the system be tweaked or overhauled to provide better performance of the marketing system.

References

Ahmed, R., and N. Rustagi. 1984. Agricultural Marketing and Price Incentives: a Comparative Study of African and Asian countries, Research Report, International Food Policy Research Institute, Washington, D.C.

Barrett, C. 1999. The Effects Of Real Exchange Rate Depreciation On Stochastic Producer Prices in Low-Income Agriculture, *Agricultural Economics*, vol. 20(3), 215-230.

Bates, R. and A. Krueger (eds.), 1993. *Political and Economic Interactions in Economic Policy Reform: Evidence from Eight Countries.* Oxford: Basil Blackwell.

Bates, R., 1981. Markets and States in Tropical Africa: The Political Basis of Agricultural Policies. Berkeley: University of California Press.

Bates, R. 1989. *Beyond the Miracle of the Market: The Political Economy of Agrarian Development in Kenya*, Cambridge, Cambridge University Press.

Binswanger, H., S. Khandker and M. Rozenzweig. 1993. How Agriculture and Financial Institutions Affect Agricultural Output and Investment in India, *Journal of Development Economics*, 41(3): 337-366.

Bird, K., D. Booth, and N. Pratt. 2003. Food Security Crisis in Southern Africa: The Political Background to Policy Failure. Forum for Food Security in Southern Africa, Theme paper No. 1, London, Overseas Development Institute.

Bratton, M. and R. Mattes. 2003. "Support for Economic Reform? Popular Attitudes in Southern Africa." World Development 31(2): 303-323.

Brunetti, A., G. Kisunko and B. Weder, 1997. Institutional Obstacles to Doing Business: Region-by-Region Results from a Worldwide Survey of the Private Sector. Policy Research Working Paper 1759, World Bank, Washington DC.

Buccola, S. and C. Sukume, 1988. Optimal Grain Pricing and Storage Policy in Controlled Agricultural Economies: Application to Zimbabwe. *World Development* 16(3): 361-71.

Byerlee, D. and C.K. Eicher (eds). 1997. *The Emerging Maize-based Revolution in Africa: The Role of Technologies, Institutions and Policies,* Lynne Rienner, Boulder.

Byerlee, D., and P. W. Heisey. 1997. Evolution of the African Maize Economy. In *Africa's Emerging Maize Revolution*, edited by D. Byerlee and C. K. Eicher. Boulder: Lynne Rienner Publishers.

Byerlee, D., R. Myers, and T. Jayne. 2005. Managing Food Price Risks and Instability in an Environment of Market Liberalization. Report, Agriculture and Rural Development Department, the World Bank, Washington, D.C.

Chapoto, A. and T.S. Jayne. 2006. Emerging Structural Maize Deficits in Eastern and Southern Africa: Implications for National Agricultural Strategies. Policy Synthesis 16, Food Security Research Project, Lusaka Zambia. Online at: http://www.aec.msu.edu/agecon/fs2/zambia/ps16.pdf

Chapoto, A., and T.S. Jayne, forthcoming. An Analysis of Food Price Risk in sub-Saharan Africa. Draft paper under review. Michigan State University and FAO/TCID, Rome.

Coulter, J. 2006. personal communication, Natural Resources Institute, Greenwich, UK.

Datt, G. and M. Ravallion. 1998. Farm Productivity and Rural Poverty in India. *Journal of Development Studies,* 34 (4): 62-95.

Chirwa, E. 2006. Commercialization of Food Crops in Malawi: Insights from the Household Survey. Working Paper 2006/04, Dept. Economics, University of Malawi, Chancellors College, Zomba, Malawi. http://www.economics.chanco.mw/papers/wp2006_04.pdf

Dorward, A., J. Kydd, J. Morrisson, and I. Urey, 2004. A Policy Agenda for Pro-Poor Agricultural Growth. *World Development* 32(1): 73-89.

Fafchamps, M. 1992. Solidarity Networks in Pre-Industrial Societies: Rational Peasants with a Moral Economy. *Economic Development and Cultural Change* 41 (1): 147-174.

FAO, 2006. Enhancing Intra-African Trade in Food and Agriculture. Background paper for the African Union/FAO Meeting of Agricultural Experts and Ministers, Libreville, Gabon, 27 November-1 December, 2006. ESTD Division, FAO, Rome.

Gabre-Madhin, E., C. B. Barrett, and P. Dorosh, 2003. Technological Change and Price Effects in Agriculture: Conceptual and Comparative Perspectives. MTID Discussion Paper 62, Washington, D.C.: International Food Policy Research Institute.

Gabre-Madhin, E. 2001. Market Institutions, Transaction Costs and Social Capital in the Ethiopian Grain market. Research Report 124, International Food Policy Research Institute, Washington, D.C.

Govereh, J., J. Shawa, E. Malawo, and T. Jayne. 2006. Raising the Productivity of Public Investments in Zambia's Agricultural Sector. Working Paper 20, Food Security Research Project, Lusaka, Zambia. Online at: http://www.aec.msu.edu/agecon/fs2/zambia/wp_20.pdf

Haggblade, S. 2006. Improving African Food Security Through Expanded Regional Trade in Food Staples: A Concept Note. Michigan State University in collaboration with Regional Partners. East Lansing.

Haggblade, S. and P. Hazell. 1988. Prospects for Equitable Growth in Rural Sub-Saharan Africa, AGRAP Economic Discussion Paper 3, Washington D.C., World Bank.

Harrigan, J. 2003. U-Turns and Full Circles: Two Decades of Agricultural Reform in Malawi 1981-2000. *World Development,* Vol 31(5), 847-863.

Hazell, P. 2003. Is there a Future for Small Farms? Paper prepared for 25th International Conference of Agricultural Economists, Durban, South Africa, August 16-23, 2003.

Herbst, J. (1990). *State Politics in Zimbabwe*. Berkeley: University of California Press.

Howard, J., and C. Mungoma. 1997. Zambia's Stop-and-Go Maize Revolution. In *Africa's Emerging Maize Revolution*, eds. D. Byerlee and C. Eicher. Colorado: Lynn Rienner.

Huffman, W. and R. Evenson. 1993. Science for Agriculture. Ames, IA: Iowa State University Press.

Jayne, T.S. and M. Rukuni. 1993. The Costs of Food Self-Sufficiency: Maize Pricing and Trade Policy in Zimbabwe, *Agricultural Economics Analysis and Rural Development,* Vol. 3, No. 2 (April), 7-31.

Jayne, T.S., 1994. "Do High Food Marketing Costs Constrain Cash Crop Production?" *Economic Development and Cultural Change*, Vol. 42, No. 2 (January): 387-402.

Jayne, T.S. and S. Jones, 1997. Food Marketing and Pricing Policy in Eastern and Southern Africa: A Survey. *World Development* 25(9): 1505-1527.

Jayne, T.S., J. Govereh, A. Mwanaumo, J. Nyoro and A. Chapoto, 2002. False Promise or False Premise: The Experience of Food and Input Market Reform in Eastern and Southern Africa. *World Development,* 30(11): 1967-1986.

Jayne, T.S. T. Yamano, M. Weber, D. Tschirley, R. Benfica, A. Chapoto, and B. Zulu. 2003. Smallholder Income and Land Distribution in Africa: Implications for Poverty Reduction Strategies. *Food Policy,* Vol. 28(3): 253-275.

Jayne, T.S., B. Zulu, and J.J. Nijhoff. 2006. Stabilizing Food Markets in Eastern and Southern Africa. *Food Policy,* 31 (4): 328-341.

Jayne, T.S., R. Myers, and J. Nyoro. 2006. The Effects of Government Maize Marketing Policies on Maize Market Prices in Kenya. Contributed paper, International Association of Agricultural Economics Tri-Annual Meetings, Gold Coast, Australia, August 12-18, 2006.

Jenkins, Carolyn. 1997. The Politics of Economic Policy-Making in Zimbabwe. *Journal of Modern African Economies* 575-602.

Johnston, B. F. and P. Kilby. 1975. *Agriculture and Structural Transformation: Economic Strategies in Late Developing Countries*. New York: Oxford University Press.

Kherallah, M., C. Delgado, E. Gabre-Madhin, N. Minot, and M. Johnson, 2002. *Reforming Agricultural Markets in Africa.* Baltimore: Johns Hopkins University Press.

Koester, U., 1986. Regional Cooperation to Improve Food Security in Southern and Eastern African Countries, Research Report 53. Washington D.C., Intl. Food Policy Research Institute.

Kopicki, R. 2005. NCPB Financial Situation, presentation at the Strategic Grains Summit, October 12-13, 2005, Regional Agricultural Trade Enhancement Programme, Nairobi, Kenya.

Levy, S., 2003. *Starter Packs in Malawi.* GDN - RAPNET, 28/02/03. Available from http://www.gdnet.org/subpages/RAPNet/Case_Studies/Case_Study_32_Intro.html.

Lopez, R. 2003. Under-investing in public goods: evidence, causes, and consequences for agricultural development, equity, and the environment. *Agricultural Economics,* Vol. 32(s1), 211-224.

Mano, R., B. Isaacson, and P. Dardel (2002). "Identifying Policy Determinants of Food Security Response and Recovery in the SADC Region: The Case of the 2002 Food Emergency". FANRPAN Policy Paper prepared for the FANRPAN Regional Dialogue on Agricultural Recovery, Food Security and Trade Policies in Southern Africa, Gaborone, Botswana, 26 – 27 March 2003.

Meerman, J. P., 1997. *Reforming Agriculture: The World Bank Goes to Market*. Operations Evaluation Study, The World Bank, Washington, D. C.

Mellor, J. 1976. *The New Economics of Growth: A Strategy for India and the Developing World*, Ithaca: Cornell University Press.

Minten, B. and Kyle, S. (1999). The impact of distance and road quality on food collection, marketing margins, and traders' wages: Evidence from the former Zaire. *Journal of Development Economics,* Vol. 60(2), 467-495.

Muyanga, M., T. Jayne, G. Kodhek, and J. Ariga. 2005. Staple Food Consumption Patterns in Urban Kenya: Trends and Policy Implications. Working Paper 19, Tegemeo Institute, Egerton Univ. http://www.tegemeo.org/documents/work/tegemeo_workingpaper_19.pdf

Myers, R. 2005. Costs of Food Price Instability in Low-Income Countries." Paper presented to the workshop "Managing Food Price Instability in Low-Income Countries," February 28 to March 1, 2005, Washington, DC.

Nijhoff, J.J., T.S. Jayne, Billy Mwiinga, and Jim Shaffer (2002). "Markets Need Predictable Government Actions to Function Effectively: the Case of Importing Maize in Times of Deficit". Policy Synthesis No. 6. MSU/MACO Food Security Research Project. Lusaka. http://www.aec.msu.edu/agecon/fs2/zambia/polsyn6zambia.pdf

Nijhoff JJ., D. Tschirley, T. Jayne, G. Tembo, P. Arlindo, B. Mwiinga, J. Shaffer, M. Weber, C. Donovan, and D. Boughton. 2003. Coordination for Long-term Food Security by Government, Private Sector and Donors: Issues and Challenges. Policy Synthesis 65, Michigan State University, Department of Agricultural Economics, East Lansing.

Omamo, S.W. 1998. Transport Costs and Smallholder Cropping Choices: An Application to Siaya District, Kenya. *American Journal of Agricultural Economics* 80 (February): 116-123.

Øygard, R., R. Garcia, A. Guttormsen, R. Kachule, A. Mwanaumo, I. Mwanawina, E. Sjaastad, and M. Wik. 2003. The Maze of Maize: Improving Input and Output Market Access for Poor Smallholders in Southern African Region, the Experience of Zambia and Malawi, Agricultural University of Norway Department of Economics and Resource Management Report No. 26, ISSN 0802-9210.

Pinckney, C. 1993. Is Market Liberalization Compatible with Food Security? *Food Policy,* Vol. 18(4), 325-333.

Pletcher, J. (2000). The Politics of Liberalizing Zambia's Maize Markets. *World Development.* Vol. 28 (1), 129-142.

Ravallion, M. and G. Datt. 2002. Why has economic growth been more pro-poor in some states of India than others? *Journal of Development Economics* 68 (2002), 381-400.

Rubey, L. 2004. Do No Harm? How Well Intentioned Government Actions Exacerbate Food Insecurity: Two Case Studies from Malawi. Report, USAID/Malawi, Lilongwe.

Rubey, L., 2005. Malawi's Food Crisis: Causes and Solutions. Report for US Agency for International Development (USAID), Lilongwe, Malawi.

Sahley, C., B. Groelsema, T. Marchione, and D. Nelson. 2005. The Governance Dimensions of Food Security in Malawi. USAID Bureau of Democracy, Conflict, and Humanitarian Assistance, Washington, D.C.

Sahn, D., Dorosh, P., and Younger, S. (1997). *Structural Adjustment Reconsidered: Economic Policy and Poverty in Africa.* Cambridge: Cambridge University Press.

Thomas, J., and Grindle, M. (1990). After the Decision: Implementing Policy Reforms in Developing Countries. *World Development,* Vol. 18 (8), 1163-1181.

Toye, J. (1992). Interest Group Politics and the Implementation of Adjustment in Sub-Saharan Africa. *Journal of International Development,* Vol 4(2), 183-198.

Tschirley, D., J. Nijhoff, P. Arlindo, B. Mwinga, M. Weber and T. Jayne, 2006. *Anticipating and Responding to Drought Emergencies in Southern Africa: Lessons from the 2002-2003 Experience.* Prepared for the New Partnership for Africa's Development (NEPAD) Conference on Successes in African Agriculture, 22-25 November 2004, Nairobi, Kenya, also published as International Development Working Paper 89, Michigan State University, East Lansing. Online at: http://www.aec.msu.edu/agecon/maizemarket/index.htm

Tschirley, D., D. Abdula, and M. T. Weber, 2005. Toward Improved Marketing and Trade Policies To Promote Household Food Security in Central and Southern Mozambique. Paper prepared for the Conference on "Toward Improved Maize Marketing and Trade Policies in the Southern Africa Region," Sponsored by the Food, Agriculture, and Natural Resources Policy Analysis Network (FANRPAN). June 21-22, 2005. Centurion Park Hotel, Centurion, South Africa.

Traub, L., and T. Jayne. 2004. Effects of Market Reform on Maize Marketing Margins in South Africa. International Development Working Paper 83, Department of Agricultural Economics, East Lansing.

van de Walle, N. 2001. African Economies and the Politics of Permanent Crisis, 1979-1999. Cambridge: Cambridge Univ. Press.

WFP/FEWSNET, 2006. Informal Cross Border Food Trade in Southern Africa. Various monthly issues, FEWSNet Regional Office, Pretoria, South Africa. www.fews.net