

**Agricultural Commercialization, Rural Transformation and Poverty Reduction:
What have We Learned about How to Achieve This?**

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1. THE CONTEXT AND THE GOAL

“Smallholder commercialization” for the purposes of this symposium refers to a virtuous cycle in which farmers intensify their use of productivity-enhancing technologies on their farms, achieve greater output per unit of land and labor expended, produce greater farm surpluses (or transition from deficit to surplus producers), expand their participation in markets, and ultimately raise their incomes and living standards. This is the vision of commercialization explored in this paper and conference.¹

Smallholder commercialization is a crucial feature of the *structural transformation process* considered by most development economists to be the major pathway from a semi-subsistence agrarian society to a more diversified and food secure economy with higher general living standards. Johnston and Kilby (1975) and Mellor (1976) first documented the structural transformation process in the regions of Asia where the Green Revolution later bloomed. The structural transformation process starts with broad-based agricultural growth, causing a build-up of purchasing power by millions of small farmers. These millions of farmers subsequently re-spend and re-cycle more money through the economy, fueling demand and employment growth in non-farm sectors, which in turn increases the demand for food and other farm products in a virtuous cycle in which the rural and urban labor force provide a market for each other. Over time, broad-based income growth causes the share of food in overall consumption to fall, leaving increased disposable income to fuel the development of non-farm sectors. As the demand for non-farm goods and services rise, the labor force responds by shifting gradually from the farm to non-farm sectors, the demand for education and job skills rise, and the economy becomes increasingly diversified and urban. Family sizes decline as migration off the farm reduces the need for farm labor. Farmers are “pulled” off the farm into viable non-farm activities, not “pushed” off the farm into low-paying desperation jobs in the towns due to the inability of local agriculture to provide a reasonable standard of living. The main starting point of structural transformation is broad based smallholder-led agricultural growth and commercialization.

Mellor, Johnston and others clearly documented that “inclusive agricultural development” in green revolution Asia was crucial to structural transformation and poverty reduction. They contrasted the Asian experience with parts of Latin America, which also achieved agricultural growth, but not in an inclusive way. Latifundio estates expanded production impressively in many cases while millions of small peasant farms remained mired in poverty. A major lesson for Africa from these contrasting experiences of smallholder-led Asia and estate-led Latin America is that if we want growth to be

¹ There are other less attractive forms of smallholder commercialization, such as poor households being forced to sell grain out of desperate need for cash, only to buy back grain later in the season at higher prices, or households that are experiencing environment degradation and unsustainability, leading to a situation in which they must pour on ever higher rates of fertilizer and pesticide in order to maintain existing yields.

inclusive it must address issues of rural poverty. And if we want agricultural growth to reduce poverty, it must be inclusive. For these reasons, there is no real alternative to a smallholder-led agricultural development strategy.

If this process of structural transformation, which has characterized the development pathways of Asia as well as Western Europe and North America, holds the brightest prospects for most of Sub-Saharan Africa as well, then we already have a very good idea of how the development process is going to happen. But do we know as much about *how to make it happen*? Largely, yes we do!

Smallholder-led agricultural development in most of Sub-Saharan Africa is going to involve two basic *Strategies*, both of them state-led:

Strategy I: State-led programs and investments to support smallholder productivity growth.

There are two categories here:

- a. Public investment in services, technologies, and institutions that are known to promote broad-based inclusive farm productivity growth. These include crop breeding and agronomic research programmes, extension programs to improve farmer husbandry practices and marketing skills, physical infrastructure to improve access to markets, etc. There is general consensus here.
 - b. Very circumscribed state-led efforts to overcome market failures, e.g., targeted input subsidy programmes aimed at overcoming credit constraints of the poorest farmers, and well managed rules-based marketing board operations to stabilize food prices within tolerable ranges. There is a compelling case to be made for such interventions in theory, and in under certain circumstances they have proven their ability to raise food production, at least temporarily. But the empirical record of state interventions in this area, especially over the longer run after accounting for their macroeconomic effects, is mixed, and there is strong evidence that such interventions may detract from the achievement of Strategy II objectives. Hence the activities under this Strategy must be handled carefully or else they will be counterproductive and un-do the entire process. Nevertheless, pragmatism and political realities indicate that government will insert itself into the development process as it has all over the world, and so governments need pragmatic support on how to structure their operations in ways that support the process and do minimal harm to the achievement of the overall goal.
- ii. State-led creation of an enabling environment to encourage private investment in the various stages of commodity value chains so as to better enable smallholders to commercialize and link into markets. Again there is general consensus here.

We will come back to both of these Strategies, the research evidence associated with them, and their implications for state programmes and policies later.

But first, why focus on “state led”? Of course, achieving broad-based agricultural commercialization leading to structural transformation will require actions from many different kinds of actors, both in the private and public sectors as well as from international financial and donor organizations. The answer is because the public sector role is decisive. Its actions will be an overriding factor in

influencing the private sector's willingness and ability to respond positively. If public sector actions do not reduce the currently high levels of risk and uncertainty in African food markets, and if governments use their scarce resources in ways that do not provide greater investment incentives for the private sector, then there will be very limited scope for the development of a market-oriented system to provide smallholder farmers with the access to markets that they need. A highly uncertain policy environment will continue to scare off bank financing for needed investment in the sector. This path will lead to frustration over the private sector's apparent unwillingness to invest rapidly enough in support of smallholder agriculture and inevitably lead to pressures to revive the more aggressive policies of the "development state" models. Indeed, such cycles typify the history of agricultural policy shifts in Africa since 1960. On the other hand, if African governments define their roles clearly, implement their roles transparently and consistently, and use their scarce resources primarily to invest in public goods that provide new profitable opportunities to engage small-scale farmers into commodity value chains, then this approach is likely to fuel private sector investment in support of smallholder agriculture, as it has in many parts of the world already. Thinking that Africa is somehow different and cannot benefit from these processes is part of the explanation for the region's historically poor agricultural performance so far. Hence, private sector investment patterns and the supply of bank financing for private investment, are largely *outcomes* of public sector behavior – its policy choices, integrity of its institutions, and the ways it spends its funds through the treasury. For these reasons, the focus of this report is mainly on what the public sector can do in the first place to generate the incentives for system-wide private investment in staple food markets. We also address the role of African governments in addressing situations of market failure, i.e., where the returns to investment are high from a social welfare standpoint but not from the standpoint of a private firm.²

Let's now consider the details of the two broad strategies identified above.

2. STRATEGY I: STATE-LED INVESTMENTS AND PROGRAMS TO SUPPORT SMALLHOLDER PRODUCTIVITY

Many parts of green revolution Asia have achieved impressive gains in agricultural productivity and poverty reduction over the past half-century. Can African policy makers learn from Asia's green revolution experience? Conditions certainly differ in many respects, and the impacts of various

² Examples of market failure include public goods and externalities. A public good such as a new road may have extremely high returns to communities enjoying greater access to markets as a result of the investment, but in most cases, private firms would not invest in roads unless they could recover the costs of the investment by, e.g., setting up a toll tax on users. Another example of market failure is the productive potential of certain open pollinating seed varieties (OPVs), which could greatly benefit farmers in many areas. However, private investment in OPVs is limited by their inability to recover costs after the first season. Unlike hybrids, which require farmers to buy seed regularly, OPVs can be recycled by farmers. OPVs are an example of an investment for which the returns cannot be fully captured by the firm, leading to external benefits to farmers. Another huge market failure is associated with the great potential social payoffs to crop breeding suitable for semi-arid areas of Africa but because of limited purchasing power in such areas, private seed companies have preferred to concentrate their breeding programs in areas where the effective demand for their products is more certain (e.g., see Lipton 2005).

investments in Asia cannot be expected to produce the same impacts uniformly across a heterogeneous African landscape. However, it is instructive to understand the mix of public investments and policies that helped many Asian countries achieve their smallholder-led green revolutions and consider the potential lessons and applicability for Africa.

2.1 What kind of public investments lead to agricultural growth and poverty reduction?

This section reviews two broad studies analyzing the returns to various types of public expenditures and policies. The first study, carried out by the Economist Intelligence Unit (EIU 2008), apportioned the relative importance of various types of public investments and strategies leading to agricultural growth and poverty reduction in six countries (China, India, Indonesia, South Korea, Taiwan, and Vietnam). The second study, carried out by IFPRI (Fan et al 2007) provides an in-depth analysis of India to identify the returns to various types of public expenditures over a 40-year period.

Main findings: The EIU study highlights the primacy of policy and the enabling environment in driving both agricultural growth and poverty reduction in most of Asia (Table 1). As stated by the report:

“In China and Vietnam, increasing individual farmers’ rights over their land and output, combined with agricultural market liberalization, substantially improved farmers’ incentives and stimulated rapid growth in output and private investment. Indeed, policy and institutional reforms have been central to (arguably, the main sources of) agricultural growth in China and Vietnam because those countries had to overcome complete state control of the entire economy. But getting institutions and policies right also mattered a great deal in the other four Asian economies as well” (p. 7-8).

“Appropriate policy reforms not only bring about one-off efficiency gains...more importantly they improve incentives for private investment in resource conservation, technology adoption, innovation, and increased modern inputs application, all of which lead to higher steady-state rates of output growth” (p. 8).

“Policy and institutional improvements can also improve equity since administrative power over farmer behavior tended to favor the wealthiest and those with the best political connections, rarely poorer individuals or communities” (p. 8).

As shown in Table 1, other investments found by the EIU study to have high payoffs were: crop science R&D and investments in rural roads, electricity, health and education. These investments helped smallholders produce more food while also improving their access to markets and services. These findings are consistent with substantial evidence from Africa showing returns to investment in agricultural R&D of over 20% per year (Oehmke and Crawford 1996; Masters 2005; Byerlee and Eicher, 1997; Lipton 2005). There is strong consistency in the research findings from Asia and Africa concerning the impacts of crop science investments. Scaling-up public investment in national crop science programmes is perhaps the single most important action that governments in the region can do to ensure the future food security of their nations.

The EIU meta-study concludes that resources invested in input subsidies and direct distribution of fertilizers and other agri-chemicals showed only modest returns on average. Input subsidies played a greater role in irrigated areas where the combination of water control, improved seed varieties

and fertilizer raised yields dramatically. Returns to subsidies were lower under rainfed conditions, especially in semi-arid areas prone to frequent drought.

The IFPRI study of India derives the estimated impacts of various types of government expenditures on both agricultural growth and poverty reduction. This study also estimates impacts at different periods in India's development path from the 1960s to 2000. As shown in Table 2, most public expenditures to agriculture in the 1960s generated very high returns to both agricultural growth and poverty reduction.

Table 1. Summary of Analysis of Six Asian Economies' Agricultural Growth Boom Periods

	Agricultural growth effects			Poverty-reduction effects		
	Median share of agricultural growth attributable to:	Median rank by total effect	Median rank by benefit/cost ratio	Median share of poverty reduction attributable to:	Median rank by total effect	Median rank by benefit/cost ratio
<i>Policy / institutional reform</i>						
<i>Infrastructure</i>	40%	1	1	30%	1	1
Rural roads	10%	3.5	3	15%	3	3
Irrigation	9%	4.5	4	8%	5	4
Electricity/health/education	9%	4	7	18%	2	4
<i>Agricultural inputs delivery</i>						
Fertilizer/seed/chemicals	10%	5	6	7%	6 (tied)	6
Agricultural credit/insurance	2%	6 (tied)	8	5%	6 (tied)	2.5
<i>Agricultural/ natural resource managmt research/ extension</i>						
Ag./NRM research	15%	2	2	10%	4	2
Ag./NRM extension	2%	6 (tied)	4	5%	6 (tied)	2.5

Source: The Economist Intelligence Unit (2008).

Table 2: Returns in Agricultural Growth and Poverty Reduction to Investments and Subsidies, India, 1960-2000.

	1960s		1970s		1980s		1990s	
	returns	Rank	Returns	rank	returns	rank	returns	rank
<i>Returns in Agricultural GDP (Rs produced per Rs spent)</i>								
Road investment	8.79	1	3.80	3	3.03	5	3.17	2
Educational investment	5.97	2	7.88	1	3.88	3	1.53	3
Irrigation investment	2.65	5	2.10	5	3.61	4	1.41	4
Irrigation subsidies	2.24	7	1.22	7	2.28	6	na	8
Fertilizer subsidies	2.41	6	3.03	4	0.88	8	0.53	7
Power subsidies	1.18	8	0.95	8	1.66	7	0.58	6
Credit subsidies	3.86	3	1.68	6	5.20	2	0.89	5
Agricultural R&D	3.12	4	5.90	2	6.95	1	6.93	1
<i>Returns in Rural Poverty Reduction (decrease in number of poor per million Rs spent)</i>								
Road investment	1272	1	1346	1	295	3	335	1
Educational investment	411	2	469	2	447	1	109	3
Irrigation investment	182	5	125	5	197	5	67	4
Irrigation subsidies	149	7	68	7	113	6	na	8
Fertilizer subsidies	166	6	181	4	48	8	24	7
Power subsidies	79	8	52	8	83	7	27	6

Credit subsidies	257	3	93	6	259	4	42	5
Agricultural R&D	207	4	326	3	345	2	323	2

Source: Fan et al., 2007

During this period, India's green revolution was just starting to take hold, which might make this period especially relevant for many African countries. Particularly high returns were generated from public investments in roads and education, which had estimated benefit-cost ratios of 6 to 9. Agricultural research investments and credit subsidies yielded benefits that were 3 to 4 times the amount spent. This was the period when improved seed varieties, fertilizer, and credit were being promoted as a high payoff technology package. Irrigation and power subsidies yielded the lowest returns in this period, though returns to irrigation investment and subsidies were estimated as more than double spending. In the 1970s and 1980s, the returns to most of the subsidy programs declined though they began to account for an increasingly large share of national budgets. Meanwhile, investments in agricultural R&D, roads and education provided the greatest payoffs in terms of agricultural growth. By the 1990s only agricultural R&D and road investments continued to yield estimated returns of more than 300 percent. Estimated net returns to irrigation investments and education were low but still positive, whereas credit, power, and fertilizer subsidies had negative net returns, and subsidies on irrigation had no significant impact on agricultural production at all (Fan et al., 2007). These findings are similar to those of Rashid et al (2006) who concluded that state subsidies in input and output markets had played a role in supporting the initial uptake of improved farm technologies in Asia but over time contributed relatively little and have now become a major drain on the treasury while crowding out other types of public investments that could produce higher payoffs.

The ranking of public investments in terms of poverty reduction impacts follow the same broad pattern as that for agricultural GDP growth. Across all decades, spending on roads, agricultural R&D, and education provided the greatest poverty reduction impacts.

The economic assessment evidence strongly indicates that if the resources that were spent on crop science had been spent on something else instead, African economies would now be poorer, government finances would be in worse shape, food import bills would be higher than they are now, and more Africans would suffer from food insecurity.

Fertilizer subsidies are estimated to have been effective at reducing poverty in the two earlier decades, but subsequently appear to have been highly ineffective (Table 2). Credit subsidies were effective in the 1960s and 1980s. As stated by Fan et al, "These results have significant policy implications: most importantly, they show that spending government money on investments is surely better than spending on input subsidies. And within different types of investments, spending on agricultural R&D and roads is much more effective at reducing poverty than putting money in, say, irrigation" (p. 18-19).

Implications for Africa: The findings of these two studies from Asia provide potential important implications for promoting agricultural growth and poverty reduction in Africa. Although the regions differ in important respects, there are strong reasons to believe that the policy reforms and investments in R&D and infrastructure that generated high payoffs in Asia are likely to be crucial drivers of growth in most of Africa as well. As concluded by the 2008 EIU:

“Our assessment is that the interventions that provided most effective in Asia – policy and institutional reforms, an agricultural research revolution, major expansion of rural roads and irrigation, and improved rural financial services delivery – must likewise be the primary targets for new strategies will vary among countries and even among agro-ecologies within countries, and must be developed internally, albeit with external financial and technical assistance. But the broader patterns are clear” (p. 18).

Recent findings from Africa on public investments to promote broad based growth and poverty reduction:

Research impact assessments from Africa show broadly consistent findings from those of Asia. Public investment in crop science -- seed research in particular -- has been found to have very high payoffs (see Byerlee and Eicher 1997 for a review of the evidence in eastern and southern Africa).

Investments to improve farmers’ production and marketing skills are also found to be important. Haggblade’s review (2011) identifies the following factors as being very important in raising smallholder farmers’ crop productivity: time of planting, weed control, practices to enhance soil fertility and soil organic matter, optimal use of fertilizer (which varies greatly across the micro-conditions found in the region), water management techniques, and pest management. The yield gains from early planting can be as high as 200 kgs per hectare per week for maize (as found in Zambia) to 100 kgs per hectare per week for cotton (as found in Mozambique). Marenya and Barrett (2009) found that management practices that raise the carbon content of maize plots in western Kenya can dramatically raise the contribution of fertilizer to yield. Conservation farming practices such as minimum tillage, ripping, and basins also appear to improve crop productivity and yield stability in the face of drought; these practices may hold great upside potential to achieve massive production gains because currently very few farmers use such technologies (Haggblade and Plerhoples, 2010).

This evidence points to the great importance of strong public and private research and extension services to serve smallholder farmers. Ironically, studies often show that the payoffs to investment in public extension programs are often low, but this is often due to the underfunding of extension programs (e.g., funds are provided for personnel and motorbikes but not for petrol to allow extension agents to move around the district to visit farmers) and to the multiple tasks that are often imposed on extension agents (e.g., allocating input subsidies to recipients or recovering credit from government input programs) which take time away from their primary function. Still, the weight of the research evidence indicates that improving farmer management skills to take advantage of on-shelf knowledge and technologies is crucial for raising smallholder productivity and promoting a more commercialized smallholder sector (Haggblade, 2011). Extension systems that can effectively deliver these services to smallholders remain a key priority in many areas of the region.

Research evidence from east Africa showing substantial benefits to smallholder farmers from investments in road infrastructure include Dorosh et al., 2010; Jin and Deininger, 2008; Dercon et al., 2009; Chamberlin and Jayne 2011.

Input subsidy programs are another major area where governments in the region have invested in smallholder productivity. Malawi, Zambia, Tanzania, and Kenya are prime examples. One of the

sessions of the Kigali Policy Symposium reviews the evidence of these programs in Malawi. The weight of the evidence³ indicates the following: (1) input subsidies can and often have dramatically increased maize production as long as the rains are adequate; (2) they tend to be captured disproportionately by better-off farmers and hence lose some of their potential impacts on rural poverty reduction; (3) resulting from point (2), they only marginally raise the proportion of smallholder farmers selling maize; and (4) they are very costly, having taken up to 45% and 70% of the Ministry of Agriculture's budget in Zambia and Malawi, respectively, and hence potentially crowd out other public investments that may produce greater long-term benefits to farmers and consumers. There is also growing research evidence that the allocation of input subsidies often serves important interests of the party in power (Banful 2009; Mason, 2011 forthcoming; Ricker-Gilbert, Jayne, and Chirwa 2010; Pan and Christiaensen, 2011), and hence cannot be easily discussed based simply on their social and economic impacts. The likelihood that input subsidy programs will continue regardless of the research evidence on their costs and benefits relative to other investments in support of smallholder welfare means that the search continues to find ways to implement input subsidy programs in ways that maximize their impacts on both productivity and poverty reduction. On this count, efforts to target subsidies more effectively to relatively poor rural smallholders will be important, combined with public programs to help them improve their agronomic management practices, generate more productive, fertilizer-responsive seed technologies, and investments in rural infrastructure to gain better access to input and output markets on a commercialized and sustainable basis.

3. STATE CREATION OF AN ENABLING ENVIRONMENT TO SUPPORT PRIVATE INVESTMENT IN AGRICULTURAL VALUE CHAINS

Staple food price instability remains a major problem in eastern and southern Africa. Many governments in the region attempt to stabilize food prices through pricing, marketing, and trade policy instruments. However, these policies tend to be implemented in *ad hoc*, stop-go, and unpredictable ways that can generate uncertainty for participants in the marketing system and create unintended consequences for the performance of food markets. Government officials may not like to think of these policies as *ad hoc*; after all, they respond to perceived needs to influence the market to protect consumers and/or farmers. However, from the standpoint of traders, millers, agro-processors, and finance institutions, the sudden imposition of trade controls, public stock releases at below market prices, changes in marketing board prices, and other actions that are difficult to anticipate can themselves be a major source of unpredictability which leads to strategic interactions between the private and public sectors in markets. These policy actions may be sources of unpredictability for the private sector unless the rules governing state operations are specified in advance so that they can reasonably anticipated, enabling market actors to update their expectations of future prices accordingly. The failure to accurately predict near-future price movements can be a source of major risk and financial loss for private traders, and those having

³ e.g., Dorward et al. 2009; Republic of Kenya 2010; Xu et al., 2009; Pan and Christiaensen 2011; Minot and Benson, 2009.

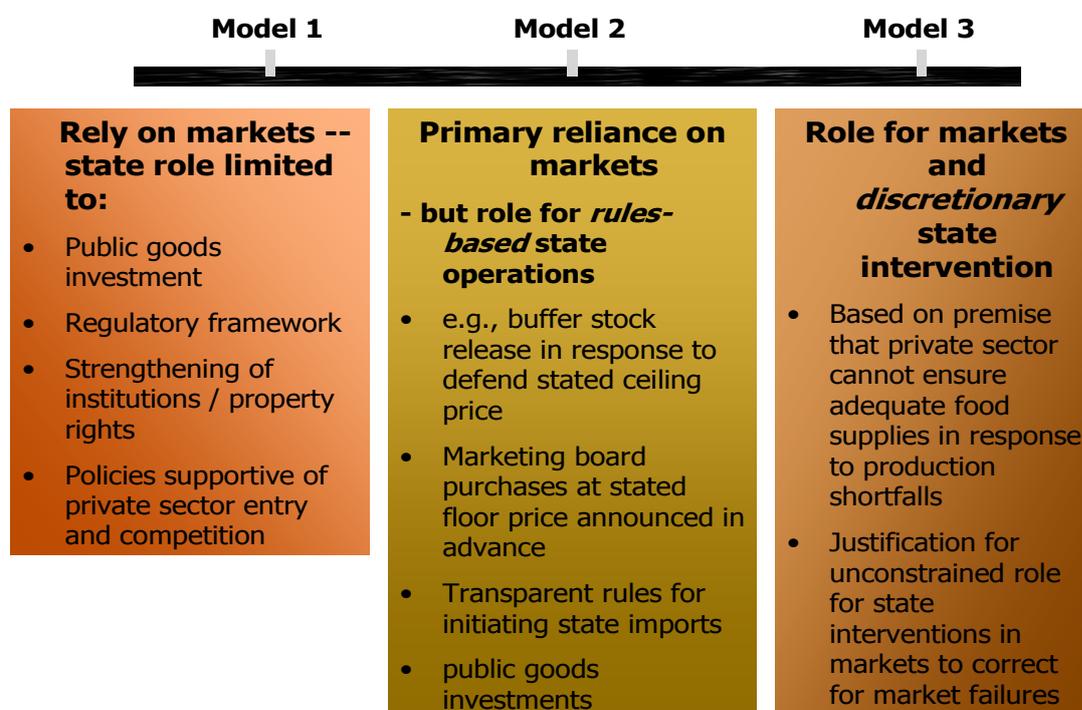
incurred such losses often exit the market or limit their future exposure to such risks, which in turn impedes the development of more vibrant and competitive marketing systems.

Three competing models have dominated policy discussions in Africa over the past decade regarding the appropriate role of the state in staple food markets (Figure 1):

Model 1: State role confined to provision of public goods to strengthen markets: This approach relies on the private sector to carry out the main direct marketing functions – purchase/assembly from farmers, wholesaling, storage, transport, milling, and retailing. The role of the state is confined to provision of public goods: market rules and regulations, physical infrastructure, regulatory oversight of finance, market information, investment in new technology, organizing farmers into groups for means of reducing costs and risks of accessing finance, inputs, and marketing. This position is close to the “Washington Consensus”, which is now generally out of favour, largely because of the hypocrisy of countries advocating for its implementation in Africa but not being willing to take the same medicine themselves.

Model 2: Rules-based state interventions to stabilize market activity: This approach also relies on markets to carry out most of the direct food marketing functions, but the role of the state is expanded to include direct marketing operations, especially in the arrangement of imports, the management of food buffer stocks, and release of stocks onto markets when prices exceed a publicized ceiling price. The rationale for state operations is based on the premise that markets fail in some respects and direct rules-based state operations are necessary maintain food prices within

Figure 1: Competing Visions of Staple Food Market Development



reasonable bounds. The defining feature of Model 2 is that there is pre-commitment: the rules governing state operations are determined in advance, publicized, and followed in a non-discretionary manner. This approach appears to be favoured by many technical analysts.

Model 3: Discretionary state intervention to provide state with maximum flexibility to achieve state policy objectives: The defining feature of this model compared to model #2 is that state operations are not confined to pre-committed rules that would constrain the state's ability to intervene only when these intervention criteria are met. Most governments in eastern and southern Africa are essentially following Model 3 and have done so from the start of the liberalization process. In practice, Model 3 has provided a highly unpredictable and discretionary approach to grain trade policy, commonly imposing export and import bans, variable import tariffs, issuing government tenders for the importation of subsidized grain, and selling their grain stocks to domestic buyers at prices that are unannounced in advance and often far below the costs of procuring it.

Therefore, in spite of the widespread perception that African governments have comprehensively adopted food market liberalization programmes, in reality the agricultural performance of many countries 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 extensive and highly discretionary government operations in food markets. Markets may be officially liberalized, but their behaviour and performance are profoundly affected by discretionary interventions by the state.

There are very few examples of Model 1 for staple foods to examine in Africa or perhaps anywhere for that matter. The rationale for Model 2 is that well executed parastatal price stabilization operations can in theory put an upper bound on food prices and also protect against downside price risk by defending floor and ceiling prices through stock accumulation and release onto markets. Successful implementation of Model 2 requires that the marketing boards possess a great deal of technical and management skill.

The weaknesses of Model 2 are that (1) given the long history of ad hoc state intervention in food markets, it is not clear whether Model 2 could be regarded as a credible policy; and (2) given constraints on available government funds for agriculture, spending on expensive government operations in food markets reduces the amount that can be spent on public investments that could potentially earn a higher social return.

Despite being the most common approach for the role of government in food markets, Model 3 is clearly vulnerable to lack of trust, cooperation and coordination between the private and public sectors. A discretionary approach to government operations creates great risks for private sector and tends to impede the private sector from performing functions that it would otherwise do more confidently under Models 1 and 2. The poor performance that results from this high degree of uncertainty and lack of coordination is often attributed to market failure, but a strong case can be made that the more central and underlying causes are chronic under-investment in public goods and a lack of credible commitment in the policy environment, leading to low levels of trust and coordination among public and private sector actors in the staple food systems.

Although price stabilization could in theory have important benefits for producers and poor consumers, along the lines of Model 2, these benefits do not appear to have been successfully

achieved because they have been pursued more along the lines of Model 3, i.e., unpredictable and untimely changes in import tariff rates, ad hoc restrictions on private importation, etc. In fact, price instability appears to be greatest in the countries where governments continue to rely heavily on marketing boards and discretionary trade policies to stabilize prices and supplies (Chapoto and Jayne, 2009). Maize price instability in countries like Malawi and Zambia are extremely high despite the persistence of these government operations. By contrast, the operations of Kenya's maize parastatal have reduced price instability (Jayne, Myers, and Nyoro, 2008). While it is difficult to estimate the counterfactual – i.e., the level and instability of food prices that would have prevailed over the past 15 years in the absence of these government operations – there are strong indications that at least some aspects of government interventions in food markets have exacerbated rather than reduced price instability for both producers and consumers.

To summarize, food markets in much of the region continue to be plagued by a high degree of uncertainty and ad hoc government entry into and retreat from markets. The high degree of policy uncertainty and control over trade impedes private investment in value chains that could otherwise improve market stability and accelerate income and employment growth. There is widespread agreement that this food marketing policy environment, however it is characterized, has not effectively supported agricultural productivity growth for the millions of small farmers in the region.

Market uncertainty also impedes investment in the agricultural sector by local banks and foreign investment capital. Local banks allocate most of their investment capital to relatively safe and high-interest government bonds and tend to be scared of investing in risky sectors. Local entrepreneurs seeking to invest in commodity value chains are thus often discouraged from doing so by the unavailability of bank financing. In these ways, there is still a great deal of sectoral reform to be gained in Africa, not necessarily by liberalizing trade (although this is still a major issue for regional cross border trade) but by unencumbering it from the risks and high costs posed by unpredictable government actions in food markets.

A “maize without borders” policy may be an important part of overall maize government policy that has the potential to reduce but certainly not eliminate price instability. This position is supported by other recent analysis (Dorosh, Dradri, and Haggblade 2009; Rashid, Cummings, and Gulati 2007). In a static sense, regional trade may be feared because it allows market shocks outside the country to be transmitted into domestic markets. This is indeed true, and to some extent this was experienced in 2008 as the major rise in world food prices were transmitted to many countries in the region, regardless of their efforts to prevent it. However, in a more dynamic sense, regional trade many facilitate private investment in cost-reducing technologies and institutions and broaden the scope of the market so that markets are increasingly able to absorb prices shocks. To the extent that market development contributes to farm-level agricultural growth and multiplier effects supporting economy-wide growth, the associated income growth can make rural and urban households less vulnerable to food price shocks. Indeed, these growth processes were major features of the structural transformations in many Asian countries. Mass hunger and starvation in response to high food prices are no longer the problems they once were in most of Asia 50 years ago (Rashid, Cummings, and Gulati 2007) although food price instability remains a thorny political problem.

Tembo and Marenya’s conference presentations examine the extent to which maize price instability affects smallholder farmers’ adoption of improved seed and fertilizer. Their findings from Kenya and Zambia show that, perhaps surprisingly, fertilizer demand is not affected by maize price risk, especially in productive areas where fertilizer on maize is profitable at a wide range of maize output prices. In marginal areas where fertilizer use is low, fertilizer use is constrained by poor soils, variable rainfall and a host of other factors leading to low response rates to fertilizer application. Because the majority of small-scale farmers are buyers of maize rather than sellers, their fertilizer use decisions are not greatly affected by output market conditions. Tembo and Marenya’s forthcoming work thus questions the conventional wisdom that output price risk is a major cause of fertilizer disadoption. Low fertilizer use rates may reflect both a lack of profitability as well as credit market failures. Many small-scale farmers simply lack access to outside sources of credit to finance their desired seasonal input purchases. Haggblade’s presentation in this conference shows that farmers’ themselves are currently the major source of financing for their input investments in agriculture. Non-farm income is an important source of working capital for farmers’ input investments. But of course, the fact that farmers themselves finance most of their input investments is for many cases a reflection of low levels of external financing availability. Low availability of bank financing is in turn a consequence of major risks and uncertainties in agriculture, some of which is caused by governments themselves.

Table 3. Small-scale farmers’ sources of funds for financing input purchases

Source of financing	2003/04	2007/08
Self-financing	58%	77%
Private outgrowers	0%	0%
Government subsidies	34%	21%
NGO	7%	1%
Bank credit	0%	0%
	100%	100%

Source: Haggblade (2011).

4. SUMMARY OF MAIN FINDINGS FROM AAMP AND GISAMA TO DATE

4.1 *Smallholders' access to output markets is better than commonly understood:*

One of the fundamental concerns about the performance of markets in Africa concerns smallholders' "access to markets". Recent large-scale survey evidence and farmer focus group discussions from the region (Kenya, Zambia, Malawi, Mozambique) reveals that even in the most inaccessible areas, smallholders cite numerous traders visiting their villages during the 4-5 months after harvest to buy surplus grain. For example, in the nationally representative Crop Forecast Survey undertaken by the Central Statistical Office in 2010, farm respondents indicated that the mean number of traders coming into their village to buy grain from farmers was 9. The mean number of traders coming into the village to buy maize in Kenya and Malawi were 18 and 12 traders, respectively, and this number did not vary between villages considered remote (20-80 km from a tarmac road) and those categorized as accessible (less than 20km from a tarmac road). Nationwide small-scale farm survey data indicate that over 50% of the farmers selling maize in Kenya, Malawi, and Zambia travelled zero kilometres to find a buyer. In other words, the traders were coming directly to the farm gate to buy maize from farmers. Similar findings hold for other nationwide surveys in Malawi and Kenya. These surveys also find that the distance travelled to the point of maize sale has declined across the sample over the past decade. This points to evidence of steady investment in grain assembly and transport over the 20 years since private grain trade was legalized. These observations call for a re-examination of the meaning of *access to markets*, *isolated area*, and similar phrases (Sitko et al 2011).

4.2 *Farmers receive about 60% to 90% of the price of maize grain observed in the district retail markets:*

By matching farm-gate prices received by interviewed farmers with prices observed in regional markets during the same period, it is found that farm prices are roughly 60% to 90% of retail maize grain prices in Zambia, Kenya, and Malawi. Yet farmers in the same villages obtained widely varying prices for their maize in the same month, indicating major differences among farmers in negotiation ability and understanding of their marketing options. These findings indicate potentially high returns to farmer marketing training to raise their incomes from surplus grain production.

4.3 *By contrast, farm-gate maize prices over the period 2000-2008 accounted for only 35% to 45% of the total value of commercial maize meal in these countries.*

Marketing and processing costs account for the lion's share, 55% to 65%, of the cost that consumers pay for commercial maize meal. This implies that new marketing technologies or institutional innovation within the marketing system that would reduce marketing costs by 10%, for example, would benefit consumers more than a 10% reduction in farm production costs brought on by new farm technology. Efforts to improve farm-level productivity are absolutely critical to achieve broad-based rural income growth and food security. Yet the potential for future farm-level income and productivity growth in the region are likely to be intimately tied to future cost-reduction in the marketing system.

4.4 *There is very limited grain storage in rural areas*

Traders frequently indicate constraints on availability of storage facilities and disincentives to engage in intra-seasonal storage. There are six main causes of disincentives to store grain and invest in storage facilities:

- i) *Staggered harvest seasons in some areas:* In regions with multiple harvests per year, such as Kenya, Uganda, and northern Tanzania, there are relatively small intra-seasonal price rises. Maize production is hitting the market at various times throughout the year. This shifts the emphasis of marketing from intra-seasonal storage to spatial arbitrage, shifting grain from places where the harvest is hitting the market to areas experiencing demand at that time.
- ii) *Unpredictable government operations in grain markets:* Highly discretionary government policies create major risks for grain storage. Export bans, sudden modification or removal of import tariff rates, and stock releases from government silos at concessionary prices are examples of how government activity can undermine the returns to intra-seasonal storage. Growing concerns over manipulation of national crop production estimates and food balance sheets also further erodes confidence in publicly provided information that plays an important role in encouraging storage activity in other parts of the world.
- iii) *The resulting grain price uncertainty inhibits commercial bank investment in grain storage and makes investing in government instruments relatively attractive:* Most governments in the region are running deficits, which they finance by offering high-interest bills and bonds. Local banks naturally are content to earn a safe return investing in these government bonds rather than make loans to highly risky investments in grain arbitrage. Reducing the policy risk in markets will encourage bank investment in African agriculture.
- iv) *Uncertainty over disposition of current marketing board storage facilities:* Most of the silo capacity in countries such as Kenya, Malawi, and Zambia remains 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. This pattern of bank investment also shifts major investible liquidity in a country into government operations and programs rather than commercial investment.
- v) *Threat of grain confiscation:* Recent events in Malawi, Ethiopia, and Kenya demonstrate that there is some risk of stored commodities being confiscated or destroyed.
- vi) *Lack of quality standards with respect to moisture content:* Assembly traders and wholesalers make little effort to discourage the buying of wet maize or to separate it from higher quality dry maize. If anything, the tendency is to combine wet and dry maize in order to mask the ability to detect wet maize by the next buyer. The storage of high-moisture content maize results in rotting and high storage losses.

4.5 *Disincentives to store grain also exacerbate the flow of grain out of informal markets*

The storage disincentives discussed above contribute to flow of grain out of rural areas in the months directly after the harvest to urban areas, only to be milled by large-scale processors and

then re-distributed back to the grain-deficit rural areas in the form of expensive commercially milled meal. This circuitous flow of grain from rural to urban areas and then back out to rural areas to meet the needs of grain-deficit rural households contributes to redundant transport costs and higher food costs for consumers.

4.6 Informal grain markets tend to become very thin in the hunger season after the majority of smallholders' surplus production has been bought up and fed into formal marketing channels.

Once in the hands of formal sector marketing agents, grain rarely gets back into informal channels. This market segmentation would not necessarily be a problem if it were not for the fact that the formal sector tends to charge much higher marketing margins than informal traders, and hence formal sector retail prices for maize meal and other finished staple products are almost always substantially higher than the retail goods processed and sold by informal traders and millers. The problem of segmented markets – a competitive and agile informal sector which is starved for capital, and a more highly-capitalized formal trading sector which is competitive in some cases and oligopolistic in others – leads to a common situation during the hungry season in which informal markets dry up and are unable to acquire grain due to barriers to regional trade and selective channeling of imports to a few formal trading firms. As a result, consumers pay considerably higher prices for their staple food than would be the case if informal markets were not discriminated against.

4.7 The staple grains policy environment in many countries in the region is highly unpredictable.

It is sometimes assumed that policy reforms were implemented and hence the policy environment poses no special challenges. We strongly disagree with this view. In fact, policy uncertainty, vacillation, and institutional vacuums are the norm in much of the region, which lead to problems of credible commitment with the private sector. Policy reforms have been implemented in a *de jure* sense but the potential benefits of such reforms are eroded by *ad hoc* policy interventions in both external trade and domestic marketing which exposes the private sector to huge risks and financial losses. All this uncertainty stifles private investment in the development of agricultural markets, which in turn continue to deprive African smallholders of services and markets that would otherwise allow them to raise their crop productivity set in motion a number of virtuous cycles.

4.8 Staple food marketing systems are characterized by weak coordination among the players in the value chain/marketing system

Transporters are unable to coordinate well with traders in the potential use of cost-reducing marketing and transport technology. Large traders in one country are often prohibited from linking with millers seeking grain in other countries. The SAFEX price discovery process, which could be so useful to governments, marketing firms and contribute to the development of more structured markets throughout the region, is frequently lost due to highly discretionary state operations in markets.

4.9 Many market failures commonly observed in the region reflect chronic underinvestment in productivity-enhancing public goods.

The costs of participation in markets are unusually high in most of Africa due to limited investment in transport infrastructure, ports, rail, road, and electricity. The ports in eastern Africa are in a state of decay and the high costs involved in importing fertilizer and other goods acts as a tax on farmers as well as the entire economy. Farmer participation in staple food markets is also constrained by weak commitments to crop science, especially relevant for semi-arid conditions, and effective extension services for farmers. Ironically, while reviews of the Asian green revolution experience underscore the very high payoffs to public investment in R&D and physical infrastructure in terms of agricultural growth and poverty reduction, these public goods investments account for a very low percentage of national budgets among most African nations and in some cases are crowded out by large-scale input promotion programs with uncertain long-term effects.

Recurrent Patterns in Smallholder Farmer Behavior

We highlights a number of recurrent patterns in smallholder farm behavior and urban consumer behavior that appear to be consistently observed in most countries for which survey evidence is available. The report highlights six main findings about smallholder crop production and marketing behavior:

4.10 Maize is generally the single most important crop in smallholder farm incomes:

When adding the value of production and sales, maize accounts for 44%, 41%, 26% and 23% of farm income in Malawi, Zambia, Kenya, and Mozambique, respectively, according to recent national surveys. The importance of maize varies greatly by region. Maize accounts for as much as 70% of farm income in some areas (generally those of relatively high agro-ecological potential), and less than 10% in others (generally the semi-arid areas). In general, maize accounts for a slightly higher share of total income on relatively large farms, except in Malawi.

4.11 Fresh fruits and vegetables are becoming more important in smallholder cropping patterns and are now rivaling maize as the highest income-generating crops for smallholder farmers.

While maize is still the dominant crop in terms of area cultivated, high-value food crops such as fruits, vegetables, and legumes account for a greater share of household income (29% of farm household income in Kenya and 28% in Mozambique, compared with 26 and 23% for maize, respectively). In Kenya and Mozambique, the smallest farms have the highest share of farm income from horticultural crops.

4.12 Maize will continue to play a crucial role in agricultural productivity growth even if its share of farm income and sales revenue may decline somewhat over time.

Smallholders' ability to diversify into higher valued activities will be influenced by the performance of staple food markets. If food is reliably available in markets at tolerable prices, smallholder farmers are likely to shift more of their land and labor into crops that provide higher returns and then use the proceeds to buy food from the market. Shifts toward higher-return activities can be a source of major productivity and income growth for smallholder farmers, but such a strategy depends on reliable availability of staple food to buy at tolerable prices.

4.13 *The sale of traditional cash crops is also highly related to landholding size*

In Zambia, Malawi, and Mozambique, the farm income share from traditional cash crops are from 7 times to over 20 times higher among households in the top landholding size quintile than in the bottom quintile. In Kenya, the farm income share of traditional cash crops is roughly constant across the landholding size quintiles, but in terms of absolute gross income, the relatively large farms derive 3-4 times more gross income from the sale of these crops than the smallest farm quintile.

4.14 *Smallholder farmers' participation in grain markets is determined by several factors including their asset position (e.g. land, labor, and capital), agro-ecological conditions, and access to markets*

Owing to a highly inegalitarian distribution of land within the smallholder sector, the marketed grain output in the smallholder sector is extremely concentrated. In all the countries in the region for which survey data is available, there is a recurrent pattern in which roughly 2-3% of relatively commercialized smallholder farmers account for half or more of the total quantity of maize sold by the smallholder sector. Rarely do more than 40% of farmers sell grain in any given year, not because buyers cannot be found, but more fundamentally because the combination of limited productive assets and limited access to improved technology precludes them from being able to produce a meaningful farm surplus.

Trends in Urban Food Consumption Patterns

We highlight three main findings about urban food consumption patterns and their implications for food policy (Jayne et al. 2010):

4.15 *Rising importance of wheat in urban staple food consumption:*

Urban consumption of wheat is rising rapidly and has become the dominant staple in many cities of East and Southern Africa. Urban consumption surveys consistently attest to the rising importance of wheat products in staple food consumption patterns. However, maize is still the dominant staple among the 30% to 40% of the poorest urban consumers.

The rising importance of wheat products in urban consumption patterns in the region has several underlying causes: i) Urbanization and growing preferences for convenience foods; and ii) the price of wheat products has declined in many cases relative to the price of maize products. We note a strong decline in the inflation-adjusted price of wheat bread over time, compared to a more modest decline (in Zambia and Kenya) or increase (in South Africa, Malawi, and Mozambique) in the real price of maize meal. The gradual decline in the retail price of wheat products compared to maize meal has contributed to the shift in urban consumption patterns over time.

Wheat is currently not well-suited for smallholder production in most of Africa. Wheat production usually requires capital-intensive investment in irrigation and other production technologies. As a result, scale economies in production cannot be achieved unless large areas can be put under production, which is beyond the means of almost all smallholders. For these reasons, the growth in

wheat consumption presents a dilemma. Ideally, economic growth is best achieved by rural-urban synergies in which urban populations create a market for rural producers, while the income received from agriculture is used to meet the demand for goods and services produced by urbanites. To the extent that urban consumers increasingly rely on products produced only by large-scale farmers or procured in international markets, these synergistic growth processes between smallholder farmers and urban consumers will be mitigated, with adverse implications for economic development.

4.16 Rapid investment in medium- and small-scale staple food processing and retailing are largely responsible for the reductions in marketing margins and retail food prices that have been documented in much of the region:

In inflation-adjusted terms, the unit price of commercial maize meal has declined by 30 to 35% in Kenya and Zambia over the 1995-2009 period (Jayne et al. 2010). Market liberalization has resulted in rapid investment in grain milling, which put pressure on the formerly oligopolistic commercial milling industry to reduce their margins. As long as grain is circulating in informal markets, consumers can buy grain and mill it at a neighborhood hammer mill, of which there are thousands dotted throughout the country. At this time, the structure of the market is highly competitive and milling/retailing margins are low. In any given area, a few large milling firms are competing against scores of small-scale millers and retailers for consumers' business. However, later in the season when maize sales off the farm tend to dwindle, the informal markets become very thinly traded. A scarcity of maize grain in local markets means that the small- and medium-scale processing sector are unable to operate. At this time, the structure of the market becomes more concentrated, and the demand for large-scale commercial millers' products jumps up as consumers now can only procure maize meal from this source. Consumers pay substantially higher prices for staple maize products at this time (Jayne et al 2010).

4.17 Grain is often unavailable to buy at certain times of the year

Even when there are adequate maize supplies nationally, once grain is purchased by the larger traders or by government marketing agencies, it generally cannot be accessed by informal small-scale millers or retailers. Large public and private traders sell mainly to commercial millers and other industrial buyers. These commercial maize products are then distributed through a variety of retail channels, including informal channels, but these products are relatively expensive compared to the less processed and less value-added products distributed through informal channels which are preferred by most low-income consumers. The drying up of informal markets during the hunger season exacerbates low-income consumers' access to food and contributes to food insecurity. During times of regional production shortfalls, these problems are accentuated. In such cases, imports from South Africa or international markets are required. Large-scale imports are usually supplied in large transactions to the large millers only, again effectively sidelining the small and medium-scale processing sector that the poor rely on and which exert competitive pressure on the large-scale processing sector to trim their margins.

5. MAIN IMPLICATIONS FOR PUBLIC INVESTMENTS AND POLICIES TOWARD THE AGRICULTURAL SECTOR

5.1. PRIORITY PUBLIC INVESTMENT OPTIONS

Based on the findings on smallholder and urban consumer behavior in Sections 5 and 6 as well as initial findings from the maize value chain studies, this section identifies a small number of priority investments that would appear to have major potential to improve the functioning of food markets, enhance national food security, and reduce poverty in the region.

5.1.1. Training Programs for Farmers to Provide Them with Knowledge and Strategies for Marketing Their Crops

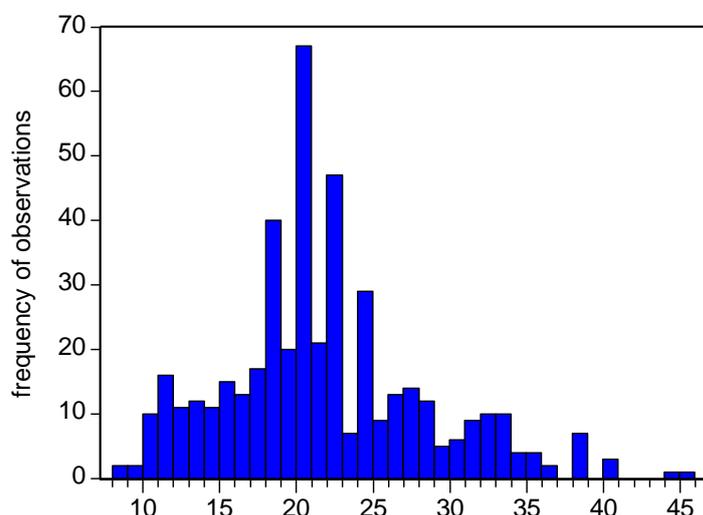
While new technologies, crop diversification, and cooperative marketing arrangements may provide farmers with the tools to move from being price-takers to price-seekers, few of these options are successfully exploited by farmers. For example, while the majority of farmers now own or have access to a mobile phone, few feel that owning a mobile phone helps them to find a better price for their maize. Instead, the majority of farmers use their phones to notify a buyer that they have maize to sell, not to negotiate a price, or to search for price differences between buyers. This passive approach to marketing is the result of a common belief among farmers that private buyers collude to set prices and price negotiation is futile. This belief, however, is not supported by empirical data. According to individual price data collected during focus group discussions in Kenya and Malawi in 2009, farmers in the same locations obtained widely varying prices for their maize in the same month (Figure 2).

Market training and education does have noticeable effects. Discussions with farmers in Kenya who have received marketing training from the Kenya Market Development Programme (KMDP) display a markedly different understanding of the challenges they face than discussion with farmers who have not received training. Rather than claim that the primary marketing problem they face is the unscrupulous behavior of private traders, which is a common refrain heard both in discussions with the Ministry of Agriculture and among farmer groups with no market training, farmers who have received KMDP training often talk about ways of increasing their gross margins, using certain strategies to explore higher prices, and even by-passing middlemen. This represents a dramatic shift from a sense of helplessness to one of entrepreneurship.

The effects of marketing training can also be measured in terms of farm gate prices. Table 27 presents the prices received by farmers in May and June 2009 for KMDP training recipients vs. non-recipients. KMDP recipients received 10% higher prices on average (22 shillings vs. 20 shillings per kg). To examine the training effect more precisely, we regressed these prices on a training dummy variable, distance of the household to the nearest market town and a village dummy to capture

spatial price differences. OLS results indicate that the KMDP recipients received, on average, 1.8 shillings per kg more than non-recipients (a 9% price difference), significant at the 5% level.

Figure 2. Frequency of Maize Prices Received by Farmers in Trans Nzoia District in May 2009 (Horizontal Axis=Maize Price Received in Shillings Per Kg; Vertical Axis=Frequency of Observations)



Source: 2009 MSU/Tegemeo Maize Value Chain Study, Kenya.

Table 4. Mean Maize Selling Price for Farmers Receiving vs. not Receiving Marketing Training, Kenya, May/June 2009

Average price per kg received by farmers exposed to market training versus those who have not received training			
Received training (n=279)	22 Ksh per kg	Standard Deviation	7.26
Have not received training (n=171)	20 Ksh per kg	Standard Deviation	6
Average price per kg (n=450)	21.5 Ksh per kg	Standard Deviation	7

For a farmer selling five bags of maize, the difference of 2 Ksh per kg is equivalent to almost 900 Ksh of additional profit, or roughly the price of a half-year of public schooling for one child. Although market training has not yet transformed farmer's groups into effective cooperative marketing enterprises, it has had a measurable effect on farmer's understanding of the maize market and their

ability to profitably and confidently participate in it. Developing greater understanding and comfort within these dynamic and intimidating markets is critical both for smallholder welfare and for the future development of the region's maize market.

5.1.2. Programmes to Encourage the Adoption of Grades and Standards

The maize value chain studies in Malawi and Kenya indicate a widespread use of improper weights for paying farmers. This is farmers' Number 1 complaint about private traders. Based on our measurements of *gorogoro* in Salgaa, Nakuru District, and Kapkwen, Bomet District in Kenya, three different sizes of *gorogoro* were identified, with sizes changing as maize moves up and down the value chain. The tins used to buy maize from farmers held 3 kg of maize, the tins used by wholesalers to sell maize to retailers held 2.25 kg, and the tins used by retailers to sell to consumers held 2 kg. Obviously these weights will change based on the moisture content of maize, but the relative difference will hold constant. The consequence of this variegated form of measurement is that, for example, if a farmer claims to have sold three 90kg bags of maize, but the assembler measured 40 *gorogoro* per bag, in all likelihood the farmer sold four 90kg bags of maize, while only being compensated for three. This is a significant loss of profit. We found similar problems in Malawi. Identifying effective ways of ensuring the use of accurate weights in farmer-assembler grain trade could have very high payoffs.

5.1.3 Programs to Encourage the Use of Adequate Maize Grading

Buying of wet maize by assemblers raises storage losses in the system. It also partially segments the maize market, because large commercial millers prohibit moisture content >13%, which forces assemblers/wholesalers to channel wet maize to other types of informal buyers, or take steps to mix wet maize with drier maize. In fact, however, some wholesalers are able to bribe their way past grain inspectors of large milling companies. The mill management are aware of these problems and aim to put pressure on inspectors but in one case said, "There is not much we can do about it." Identifying strategies for encouraging a wider use of maize grading would reduce storage losses and probably encourage incentive for seasonal storage.

5.1.4 Invest in Rural Feeder Roads to Reduce Marketing Costs

Abundant evidence indicates that the highest per kilometer costs are incurred between the farm gate and the nearest motorable road. The marketing costs associated with moving grain or fertilizer 25 km on a dirt path by bicycle trader is about the same as that charged to move the same product 500 km along a tarmac road. While traders appear in most cases to be moving to the farm gate to buy product, they charge farmers for this service, which is a function of the costs associated with transporting grain from the farm to the place where a large truck is able to bulk up supplies. Efforts to improve road networks linking district towns to farming villages could be a cost-effective way of improving smallholders' competitive position vis a vis traders and would reduce costs for all manner of commerce, not simply grain trading.

5.1.5. More Generally, Find Strategies for Encouraging Governments to Re-Allocate Their Own Resources to Prioritize Investment in Agriculture-Supportive Public Goods

Donor resources generally are dwarfed by the size African governments' own budgets. Identifying strategies to leverage donor funds so as to positive influence the allocation of government resources may have high payoffs. Governments could make a major contribution to the welfare of their rural and urban populations by prioritizing investments in crop science, effective extension programs, irrigation, and physical infrastructure. Many agricultural market failure problems in Africa reflect an under-provision of public goods investments to drive down the costs of marketing and contracting. 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. 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.

5.1.6. Coming to Grips with the Likelihood That a Large Fraction of the Smallholder Population Will Not be Surplus Food Producers until Land and Resource Constraints Are Addressed

Given the existing distribution of landholdings within the small farm sectors of eastern and southern Africa, strategies to improve rural households' access to land may need to be on the agenda. Farmer organization can help to some extent to overcome dis-economies of scale associated with small farmers' attempts to acquire inputs and marketing output. However, the evidence suggests that as the land frontier closes in many parts of the region, mean smallholder farm size continues to gradually decline even with very low rural population growth. The bottom 25% of rural agricultural households is virtually landless, having access to 0.50 hectares per capita or less in each country examined. Even farmers in the second land quartile have less than 1.2 hectares. Without major productivity growth or shifts to higher-return activities, at least 50% of the smallholder households in the region are unlikely to produce any significant food surplus or escape from poverty directly through agriculture. In this context, the main issue is not how to ensure that smallholders can participate in evolving modern supply chains. The more fundamental questions involve how to enable smallholder farmers to gain access to productive resources and how to improve the productivity of their scarce resources so that they are capable of producing a meaningful farm surplus in the first place.

In many parts of the region, governments may be able to promote equitable access to land through a coordinated strategy of public goods and services investments to raise the economic value of customary land that is currently remote and unutilized. This would involve investments in infrastructure and service provision designed to link currently isolated areas with existing road and rail infrastructure and through allied investment in schools, health care facilities, electrification and water supply, and other public goods required to induce migration, settlement, and investment in these currently under-utilized areas. Such investments would also help to reduce population pressures in areas of relatively good access and soils, many of which are being degraded due to declining fallows associated with population pressure. The approach of raising the economic value of land through public investments in physical and marketing infrastructure and service provision was successfully pursued by southern Rhodesia and Zimbabwe starting in the 1960s with its "growth point" strategy in the Gokwe area, once cleared of tse tse flies. Key public investments in this once desolate but agro-ecologically productive area induced rapid migration into Gokwe from heavily

populated rural areas, leading to the “white gold rush” of smallholder cotton production in the 1970s and 1980s (Govere 1999). A second and complementary approach would be to institute more transparent and orderly procedures for the allocation of state and customary land (Munshifwa 2002; Stambuli 2002). Such an approach would be of limited feasibility in countries such as Rwanda, but could have much potential in parts of Zambia, Mozambique, and even Malawi.

5.1.7. An Important Component of an Agricultural Markets Programs Should Be On-The-Ground Monitoring of Program/Policy 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. It would also enable researchers to measure more accurately the impacts of particular marketing policy strategies (as actually implemented instead of basing their impact assessments on stated policy documents). This will reduce the tendency to misidentify policy effects and thereby provide a more accurate empirical foundation for future discussions of food marketing and trade policy options.

5.2. POLICY ACTIONS TO PROMOTE THE DEVELOPMENT OF MARKETS

A complicating factor in supporting the development of food marketing systems to promote small farmer productivity growth is that food markets are politically sensitive. Elections can be won or lost through policy tools to reward some farmers with higher prices and reward others with lower prices; however, this is hardly unique to developing countries (Bates and Krueger 1993; Bratton and Mattes 2003; Sahley et al. 2005). 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 respond to food price instability by taking populist stances that may entrench dependence on food or fertilizer handouts, but which do little to alleviate poverty or hunger in the longer run. A related challenge is 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:

5.2.1. Follow Clearly-Defined and Transparent Rules for Triggering Government Intervention.

Governments and private trading firms strategically interact in staple food markets – they respond to each other’s 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, especially with regard to changes in marketing board purchase and sale prices, import and export decisions, and stock release triggers. Interviews with bank managers in the region demonstrate that policy risk continues to prevent the full achievement of government’s aim of promoting private capital investment in value chains that link smallholder farmers into markets.

Governments may consider how to shift their operations in agricultural markets from *ad hoc* unconstrained interventions to a “rules-based” approach to foster stability and predictability in the policy environment (Chapoto and Jayne 2009). This transition will promote international and local capital investment in the value chain. As investment rises in the storage, transport, processing, and related middle-stages of the value chain, this will raise employment and income and will increasingly diversify the economy. As incomes rise over time, the share of food in peoples’ disposable incomes fall, thereby making food price instability less of a problem. In this manner, a market-oriented approach to food systems development is likely to offer the greatest potential over time to buffer rural and urban consumers from the vagaries of international food markets.

5.2.2. Institute Regular Periodic Government-Private Sector Consultations to Coordinate Decision Making.

This will help to nurture trust and cooperation and avoid surprises.

5.2.3. Eliminate Export Bans and Import Tariffs on Trade among COMESA and SADC Member States.

This will accelerate the development of both regional and domestic marketing systems and promote access to markets for smallholder farmers, both on the selling and buying side.

5.2.4. Streamline Border and Custom Clearing Processes and Removing Controls on the Issuing of Import and Export Permits.

This would promote the interests of both producers and consumers over the long run.

5.2.5. Support the Development of Commodity Exchanges and other Market Risk Shifting Mechanisms

Market risk-shifting tools (such as warehouse receipt systems, commodity exchanges offering spot, forward, and option contracts where possible) are an important part of the tool kit to help stabilize food markets in the region. However, self-sustaining market-oriented risk transfer mechanisms are unlikely to develop in an environment where one actor (e.g., the government) has the power and proclivity to influence price levels in a discretionary way, as this would mean that certain actors would have an information advantage that they could benefit from at the expense of other traders.

The development of modern risk management tools cannot thrive under a clearly un-level playing field. A recent GISAMA study by Sitko et al. (2011) identifies the reasons highlighted by large-scale farmers, millers, brokers, and traders as to why they choose not to trade across the Zambian Agricultural Market Exchange (ZAMACE). The main reasons are related to asymmetric information leading to moral hazard and adverse selection problems, deliberate attempts to hide information considered unfavorable to one's position in the market, perceptions that it is possible to move the price in a particular direction through strategic behavior of one or two market participants, lack of delivery guarantees in case of arbitration disputes, perceptions of limited recourse if a trading partner attempts to default from contracts negotiated through the commodity exchange, and the government operations in the market that often give rise to unexpected price movements, which then provide incentives for some partners to break contracts made earlier. These problems will be difficult to resolve, and progress will be achieved only after a critical mass of traders, processors, brokers, and large farmers agree to pre-commit themselves to using commodity exchanges so that the internal pressures of the private actors themselves drives the development of the institution. And government support for the enabling environment is also key. For the time being, as long as donors are the only ones pushing, viable commodity exchanges in the region are a long way off.

5.2.6. Take Steps to Actively Nurture and Encourage Informal Regional Trade.

Informal traders can play a valuable role in buying grain in surplus areas and making it available in deficit regions as there are supplies across the border to allow informal cross-border trade (e.g., between Mozambique and Malawi; Zambia and DRC; Zambia to Zimbabwe; Uganda to Kenya, etc.). However, when the region itself runs into a tight market situation, as in 2008/09, imports from South Africa or the international market are now required to keep price levels within tolerable levels. In this situation, the market structure changes completely. Informal traders generally lack the expertise, the access to finance, or the license to contract with commercial trading firms in South Africa or the international market, so they are effectively sidelined from participating in the market. There are only a few registered trading companies in each country who are able to contract with international trading firms (with exception of Kenya). However, these firms strongly prefer to line up large buyers (generally millers) to whom to contract with for the imported maize, i.e., "back to back" transactions. They line up the buyer for immediate resale in the process of arranging to import. The problem with this approach is that the local public markets still remain starved for grain – these channels simply dry up, making all urban consumers dependent on the large millers for maize meal. Trading margins tend to go up during these periods because the large millers now are under little or no competition from the informal marketing system including small-scale millers.

Regional and local trade can also be more supportive of the needs of low-income urban and rural consumers by marketing board actions to sell its stocks not just to large-scale millers but also to local small- and medium-scale millers and other market participants. The existing system of channeling all formal imports to large millers starves informal markets, makes the structure of the milling and retailing stages of the system less competitive, and imposes major costs on urban consumers and grain-deficit smallholder farmers.

5.2.7. 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.

5.3 Strategies to Overcome Market Failures

5.3.1. Performance Contracts with International Seed Companies

Chronic underinvestment in agricultural technologies and seed breeding programs appropriate for semi-arid lands results from the limited financial payoffs for private companies to develop programs in such areas. Yet the social payoffs to improved agricultural technologies in such areas (i.e., improvements in crop yields, food security and poverty reduction) may be very high. Donor agencies can help overcome this kind of market failure by working with national and regional agricultural organizations to develop improved crop seed technology relevant for the semi-arid areas that characterize much of eastern and southern Africa (Lipton 2005; Bhagwati 2005). Strategies attempting to link African farmers to markets must take account of how low crop productivity and inequality in productive assets constrain most smallholders' ability to participate in markets. Performance contracts with international seed companies would mobilize the needed expertise to expand the potential for surplus production in semi-arid areas and stimulate investment in assembly markets to improve smallholder farmers' access to markets.

5.3.2 Missing markets for lime and other inputs

A similar gap in social returns vs. private returns may exist in regions where smallholder soil conditions are highly acidic and where lime application may be high, but where private firms perceive little demand for the product. This is partially a public extension problem; farmer demand for viable inputs would be higher if they were aware of the inputs' benefit to them. However, an infant industry argument can be made for lime and perhaps other inputs that are relatively unknown to small-scale farmers. After a few years of subsidized public distribution (e.g., include lime in the input subsidy programme packs in regions where soil acidity is a problem), the demonstration effect should raise the commercial demand for lime and hence provide incentives for supply chain development by private firms. Herbicide may be another such input – very few farmers know how to use it, but research indicates potentially high payoffs to maize productivity (e.g., Burke et al., 2011).

6. CONCLUDING REMARKS

History suggests the necessity of productivity increases in smallholder agriculture. Except for a handful of city-states, there are virtually no examples of mass poverty reduction since 1700 that did not start with sharp rises in employment and self-employment income due to higher productivity in small family farms (Lipton 2005).

Making markets work for smallholder farmers will require actions from many different actors, both private and public, as well as from international financial and donor organizations. Our premise, however, is that the public sector role is decisive. If public sector policy choices do not reduce the currently high levels of risk and uncertainty in African agricultural markets, and if governments use their scarce resources in ways that do not provide greater investment incentives for the private sector, then there will be limited scope for private investment to provide smallholder farmers with the access to markets that they need. Financial markets will also stay away from African agriculture if the risks of investment remain very high relative to the returns. On the other hand, if African governments define their roles clearly, implement these roles transparently and consistently, and invest their scarce resources in ways that make the greatest contribution to agricultural growth and poverty reduction, then this approach is likely to leverage even greater private investment in support of smallholder agriculture. When the conditions are created for profitable and stable private investment, the private sector has in other parts of the world grown and responded as seen in much of Asia, and there is little reason to believe Africa is different. Hence, private sector investment patterns and the supply of bank financing for private investment, are largely *outcomes* of public sector behavior – its policy choices, integrity of its institutions, and the ways it spends its funds through the treasury.

For these reasons, we conclude that there is no single or deterministic “future” of the small farm in Africa. The decisions made by governments primarily and international organizations secondarily will largely determine the future of smallholder agriculture in the region. Without renewed attention to sustained agricultural productivity growth, most small farms in Africa will become increasingly unviable economic and social units. Sustained agricultural productivity growth and poverty reduction will require progress on a number of fronts, most importantly increased public goods investments to agriculture, a policy environment that supports private investment in input, output and financial markets and provision of key support services, a more level global trade policy environment, supportive donor programs, and improved governance. Subsidies, if they are focused, well conceived and implemented, and temporary, can play a complementary role but should not – based on both the Asian and African evidence presented here – be seen as the primary engine. Most of these challenges can be met. Meaningful progress will start when the political will is mobilized to adopt the policies and public investments which substantial evidence shows have the greatest chances of driving sustainable pro-poor agricultural growth.

REFERENCES

- Banful, Afua. 2009. Old Problems in the New Solutions? Politically Motivated Allocation of Program Benefits and the “New” Fertilizer Subsidies. Discussion Paper 01002, International Food Policy Research Institute, Washington, D.C.
- Bates, R. and A. Krueger (eds). 1993. Political and Economic Interactions in Economic Policy Reform: Evidence from Eight Countries. Oxford: Basil Blackwell.
- Bratton, M. and R. Mattes. 2003. Support for Economic Reform? Popular Attitudes in Southern Africa. *World Development*, 31(2): 303-23.
- Burke, W., M. Hichaambwa, D. Banda, and T.S. Jayne. 2011. The Cost of Maize Production by Smallholder Farmers in Zambia. Working Paper No. 50, Food Security Research Project, Lusaka, Zambia.
- Byerlee, D. and C.K. Eicher (eds). 1997. The Emerging Maize-based Revolution in Africa: The Role of Technologies, Institutions and Policies. Boulder, CO: Lynne Rienner Publishers.
- Byerlee, Derek, T.S. Jayne, and Robert J. Myers (2006). Managing food price risks and instability in a liberalizing market environment: Overview and policy options. *Food Policy*, 31, 4, 275-287.
- Chapoto, A. and T.S. Jayne. 2009. The Impacts of Trade Barriers and Market Interventions on Maize Price Predictability: Evidence from Eastern and Southern Africa. MSU International Development Working Paper No. 102. East Lansing: Michigan State University.
- Deininger, K. and H. Binswanger. 1995. Rent Seeking and the Development of Large-Scale Agriculture in Kenya, South Africa, and Zimbabwe. *Economic Development and Cultural Change* 43 (3) (April): 493-522.
- Dercon, S., D. Gilligan, J. Hoddinott, and T. Woldehanna. 2009. The Impact of Agricultural Extension and Roads on Poverty and Consumption Growth in Fifteen Ethiopian Villages. *American Journal of Agricultural Economics*, 91(4) (November 2009): 1007-1021
- Dorosh, P., S. Dradri, and S. Haggblade. 2009. Regional Trade, Government Policy, and Food Security: Recent Evidence from Zambia. *Food Policy* 34.4: 350-66.
- Dorosh, P., H-G. Wang, L. You, and E. Schmidt. 2010. Production and Road Connectivity in Sub-Saharan Africa A Spatial Analysis. The World Bank, Africa Region, Sustainable Development Division, Washington, D.C.
- Dorward, A., E. Chirwa, V. Kelly, T. S. Jayne, R. Slater, and D. Boughton. 2008. Evaluation of the 2006/07 Agricultural Input Subsidy Programme, Malawi. Final Report. Imperial College, Michigan State University, and Wadonda Consult, Lilongwe, Malawi.
- Economist Intelligence Unit. 2008. Lifting African and Asian Farmers out of Poverty: Assessing the Investment Needs. Research report for the Bill and Melinda Gates Foundation. New York: The Economist Intelligence Unit.
- Fan, S., A. Gulati, and S. Thorat. 2007. Investment, Subsidies, and Pro-Poor Growth in Rural India. IFPRI Discussion Paper No. 716. Washington, D.C.: International Food Policy Research Institute.
- Govere, J. 1999. Impacts of Tsetse Control on Immigration and Household Accumulation of Capital: Zambezi Valley, Zimbabwe. PhD Diss., Michigan State University, East Lansing.
- Haggblade, S. 2011. Productivity Gains from Improved Smallholder Farm Management, presentation for AAMP/GISAMA Policy Symposium, April 21, 2011, Kigali Rwanda.
- Haggblade, S. 2011. Financing Smallholder Commercialization, presentation for AAMP/GISAMA Policy Symposium, April 21, 2011, Kigali Rwanda.

Haggblade, S. and C. Plerhoples. 2010. Productivity Impact of Conservation Farming on Smallholder Cotton Farmers in Zambia. S Working Paper No. 47, Food Security Research Project, Lusaka, Zambia, July 2010.

Jayne, T.S., Myers, R.J. & Nyoro, J. 2008. The effects of government maize marketing policies on maize prices in Kenya. *Agricultural Economics*, 38(3): 313–325.

Jayne, T.S., Nicole Mason, Robert Myers, Jake Ferris, David Mather, Margaret Beaver, Natalie Lenski, Antony Chapoto, and Duncan Boughton. 2010. [Patterns and Trends in Food Staples Markets in Eastern and Southern Africa: Toward the Identification of Priority Investments and Strategies for Developing Markets and Promoting Smallholder Productivity Growth](#). International Development Working Paper 104. Michigan State University, April 2010.

Jin, S. and K. Deininger. 2008. Key Constraints for Rural Non-Farm Activity in Tanzania: Combining Investment Climate and Household Surveys, *Journal of African Economies*, 18 (2): 319–361

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

Lipton, M. 2005. Crop Science, Poverty, and the Family Farm in a Globalising World. 2020 Discussion Paper 40, International Food Policy Research Institute, Washington, D.C.

Mason, N. 2011 forthcoming. Effects of Government Input and Output Marketing Subsidies on Smallholder Behavior and Welfare in Zambia. PhD Dissertation, Michigan State University, East Lansing.

Masters, William A. 2005. Paying for Prosperity: How and Why to Invest in Agricultural Research and Development in Africa. *Journal of International Affairs*, 58(2): 35-64.

Marenya, P. and C. Barrett. 2009. State-conditional Fertilizer Yield Response on Western Kenyan Farms. *American Journal of Agricultural Economics*, 91(4): 991–1006.

Mellor, J. 1976. *The New Economics of Growth*. Ithaca, NY, Cornell University Press.

Minot, N. 2011. Contract Farming in Sub-Saharan Africa: Opportunities and Challenges, draft report presented at AAMP/GISAMA Policy Symposium, April 21, 2011, Kigali Rwanda.

Minot, N. and T. Benson. 2009. Fertilizer subsidies in Africa: Are vouchers the answer? IFPRI Issues Brief 60. Washington, DC: International Food Policy Research Institute.

Munshifwa, E. (2002). Rural Land Management and Productivity in Rural Zambia: The Need for Institutional and Land Tenure Reforms. Paper presented at the Surveyor's Institute of Zambia Seminar, July 2002, Oxfam.

Oehmke, J. and E. Crawford, 1996. "The Impact of Agricultural Technology in Sub-Saharan Africa." *Journal of African Economies* 5:271-92.

Pan, L., and L. Christiaensen. 2011. Who is Vouching for the Input Voucher? Decentralized Targeting and Elite Capture in Tanzania, World Bank, Washington, D.C.

Platteau, J. 2004. Monitoring Elite Capture in Community-driven Development. *Development and Change* 35: pp.223-246.

Republic of Kenya, 2010. Progress and Way Forward for NAAIAP. The National Accelerated Agricultural Inputs Access Program (NAAIAP), Ministry of Agriculture, Nairobi.

Rashid, Shahidur, Ralph Cummings Jr., and Ashok Gulati. 2007. Grain Marketing Parastatals in Asia: Results from Six Case Studies. *World Development*, 35(11): 16.

Ricker-Gilbert, J., T.S. Jayne, and E. Chirwa. 2011. Subsidies and Crowding Out: A Double-Hurdle Model of Fertilizer Demand in Malawi. *American Journal of Agricultural Economics*, 93(1, February): 26-42.

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

Sitko, N., T.S. Jayne, J. Mangisoni, L. Kirimi, F. Karin, D. Tschirley, D. Boughton, C. Donovan, H. Zevale, D. Banda. 2011 forthcoming. *Maize Value Chains in Eastern and Southern Africa*. International Development Working Paper, Michigan State University, East Lansing.

Stambuli, K. 2002. *Elitist Food and Agricultural Policies and the Food Problem in Malawi*. *Journal of Malawi Society - Historical & Scientific*, 55(2).

Tembo, Gelson, and Paswel Marenya. 2011. *Effects of Output Price Risk on Farm Input Demand: The case of Zambia and Kenya*. Presentation for AAMP/GISAMA Policy Symposium, April 21, 2011, Kigali Rwanda.

Toye, J. 1992. *Interest Group Politics and the Implementation of Adjustment in Sub-Saharan Africa*. *Journal of International Development*, 4(2): 183-98.

Xu,Z.,W. J. Burke,T. S. Jayne.,and J. Govereh. 2009. *Do Input Subsidy Programs Crowd In or Crowd Out Commercial Market Development? Modeling Fertilizer Use Decisions in a Two-Channel Marketing System*. *Agricultural Economics*, 40(1): 79-94.