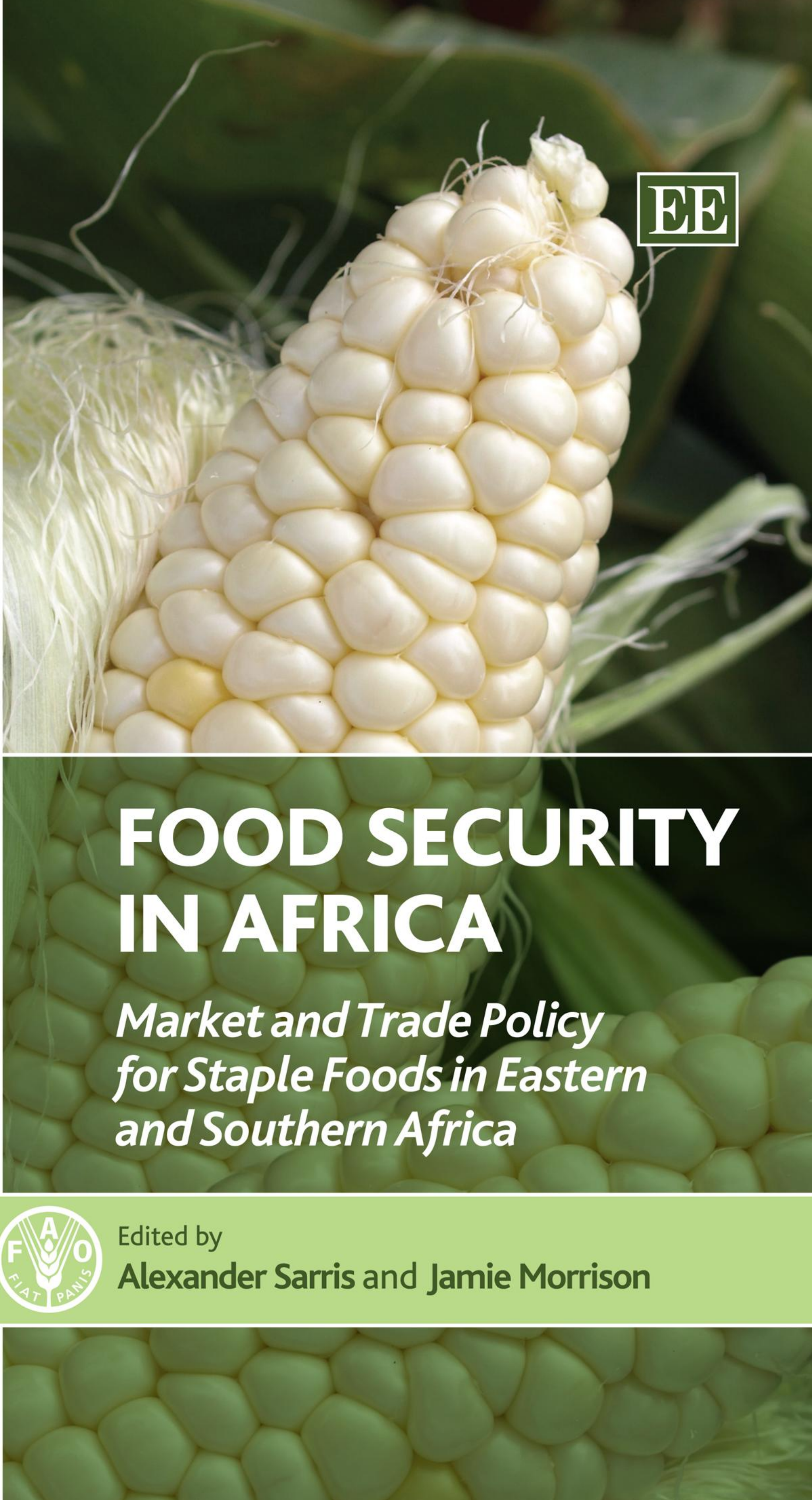

FOOD SECURITY IN AFRICA

Market and Trade Policy for Staple Foods in Eastern and Southern Africa

Edited by
Alexander Sarris and Jamie Morrison

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Preface

The origins of this volume stem from interactions with developing country government officials and policy makers on trade-related issues, where it became apparent that there was a need to supplement the debates related to multilateral trade negotiations, and associated trade capacity-building activities, with a clearer understanding and reflection among policy makers and those seeking to provide policy advice, on the type of agriculture sector trade policy that would be desirable for different developing countries, in boosting their growth and enhancing their food security situation.

The perception is that many developing countries are not in a strong position to articulate their strategy for trade negotiations and end up being passive recipients of various modalities and rules, largely formulated by, and based on strategies and interests of, other countries, the purpose of which is not necessarily compatible with promoting their own development. At the same time, this weakness may have led to the defensive strategies of many developing countries who seek to maintain high bound levels of agricultural protection, despite the perceived large margins of concessions they could offer in light of the large tariff overhangs.

One of the regions where this need is felt very strongly is Eastern and Southern Africa. The region has considerable potential for producing basic food products, such as cereal staples, but has experienced growing imports of these and related food products over the last decade.

In response to such observations, the FAO Trade and Markets Division convened at the end of 2007 a meeting of 40 experts from African universities and research institutes, regional organizations, grain trading companies, donor agencies and international organizations. Selected papers presented at the meeting, after appropriate revisions, form the first set of chapters in this volume. Subsequent to the meeting, a series of country case studies were undertaken by the participants representing the African universities and research institutes. A selection of these case studies form the basis of the second set of chapters in this volume.

The editors would like to acknowledge the active participation of all workshop participants and authors of the various chapters in this volume. In particular, they would like to thank Thom Jayne of Michigan State University for his assistance in organizing the meeting, identifying

suitable case studies, as well as with the editing of these case studies into their current versions. The editors would also like to thank Emily Carroll and Katherine Clyne of the FAO Trade and Markets Division for their assistance in formatting the manuscript.

1. Introduction

Jamie Morrison and Alexander Sarris

Trade policy instruments have been used by governments in Eastern and Southern Africa (ESA) in pursuit of a range of policy objectives. Import tariffs and export taxes have been used for revenue-raising purposes, and in conjunction with import licensing and export restrictions, to modify trade in an attempt to stabilize domestic staple food availability and food prices for food security reasons.

Trade policy remains key in the narrow range of instruments that are feasibly available to many poorer developing countries due to their limited budgetary resources and administrative capacity. Although tariffs have generally been applied at relatively low levels across the region, countries recognize the importance of maintaining bound (allowable) tariffs at higher rates to provide flexibility in their use in support of sectoral development, and as safeguard measures to allow short-term increases in applied tariffs to offset potential damage to domestic sectors as a result of surges in competitive or subsidized imports.

Trade policy debates in recent times have been coloured by the fact that the domestic market impacts of freer trade in individual countries have not necessarily been the primary focus of attention. The fora of debate relating to the use of trade policy have generally been in the context of trade negotiations, with often conflicting results of analytical studies used to put pressure on trading partners to encourage further reduction of barriers to trade and to minimize the potential use of safeguard measures. The divisive debates surrounding the potential World Trade Organization (WTO) Special Product provisions and on the potential use of a Special Safeguard Mechanism are a case in point. As a result, trade negotiations are in danger of inadvertently constraining countries' ability to use trade policy as a component of policy interventions in support of increased productivity levels in their agriculture sectors.

However, the use of trade policy instruments in pursuit of multiple objectives has often had unintended effects, increasing rather than reducing levels of uncertainty facing producers, traders and consumers, and thereby undermining domestic policy interventions implemented in support of agriculture sector development.

The use of trade policy in pursuit of food security objectives has been particularly prominent in the context of the recent wide swings in food prices to which some importing countries initially responded by further reducing already low levels of applied tariffs, while some exporting countries applied export restrictions in an attempt to exert downward pressure on domestic prices.

The combination of limited substantive evidence on appropriate trade and domestic policy interventions, the misuse of existing evidence in trade negotiations and the unpredictable nature of trade policy use in practice, has therefore made it difficult to create an objective debate as to exactly what roles trade and domestic policy should play in specific country and sector contexts.

There is, therefore, a felt need in many developing countries to promote an improved understanding of how agricultural trade policies are related to overall growth, food security and poverty alleviation objectives and strategies, and what types of agricultural and food sector trade policies would be more conducive to the various development objectives. Not only is this a prerequisite to successfully negotiating appropriate trade rules in the multilateral, regional and bilateral trade agreements, but it is critical to the design of trade policy supportive of such objectives.

One of the regions where this need is felt strongly is ESA. The region has considerable potential for producing basic food products, such as cereal staples, but has experienced growing food imports of those, and other related products, over the last decade. Data suggest that of the very large and growing imports of cereals into Eastern and Southern African countries, only a small share originates in those countries or in other African countries in general. This is a matter of considerable importance, as any enhanced production in the region will need to find market outlets in national and regional markets in order to boost rural incomes and food security. Appropriately formulated national and regional trade policies are likely to be crucial in ensuring that both national and regional markets grow and serve the development objectives of boosting domestic and regional production.

However, the understandable focus of the current policy debate in ESA on the unpredictability of the use of trade policies by some governments, and the negative knock-on effects that this can have on trade and on private sector investment, has clouded the debate relating to appropriate trade policy interventions.

This volume attempts to contribute to a more objective debate on the role of trade policy in Eastern and Southern African grains markets. It does so by reviewing analytical knowledge and practical experience in the area of agricultural and food trade policy, particularly as it concerns basic food products. It takes stock of the factual information about food markets in ESA, clarifies the evidence and fills gaps in existing knowledge as far as the functioning of these markets is concerned. The volume includes both theoretical and empirical analysis of appropriate trade policy in the context of food markets in ESA, and through a series of country case studies examines the experience of countries in the region concerning the effectiveness of their policy interventions in these markets.

Chapters 2 to 8 are based on a set of papers prepared for an FAO workshop on 'Trade Policy for Food Products Conducive to Development in Eastern and Southern Africa'. Chapters 9 to 13 were prepared on the basis of five country case studies commissioned to address and shed further light on a number of questions arising from that workshop.

The volume begins with a challenge to the orthodox view that more liberal trade policy regimes are optimal. Ed Buffie (Chapter 2) suggests that empirical and theoretical work during the 1990s and 2000s argues for a re-evaluation of the pros and cons of a liberal *vis-à-vis* more interventionist set of policies. He highlights the fact that agriculture sectors in ESA have not unambiguously benefited from a move towards more liberal trade regimes. Buffie uses a simple two-good trade model to demonstrate that trade taxes, although in theory not a first-best solution to market distortions, can be significantly superior to alternative forms of intervention once administrative and disbursement costs are accounted for. Taking his arguments forward, Buffie challenges the orthodox views on protectionism and poverty, suggesting that the widely used static models are inadequate and that optimizing dynamic trade models provide a better conceptual paradigm: 'For example, protection of both food staples and agro-industry is pointless in a static model but a potentially attractive strategy in a dynamic model. . . . Using trade policy to foster movement up the supply chain may be the right strategy *precisely because* food processing is highly capital intensive'.

To illustrate the point, Buffie develops a dynamic variant of the Ricardo–Viner model, using it to examine both steady-state outcomes and transition paths following the introduction of import tariffs and export promotion as a way of warning against the neglect of dynamic effects in the traditional static models and the inadequate incorporation of dynamics into the commonly used computable general equilibrium (CGE) platforms. Buffie then discusses critical elements to be included in appropriately formulated dynamic models including insights from the infant industry literature, underemployment and investment. His concluding challenge to analysts is to devote more attention to developing fully articulated dynamic models, where the returns are likely to be greater than where 'the marginal return to crunching numbers for another CGE trade model with 40–100 sectors is low, bordering on negligible'.

Chapter 3, by Christopher Barrett, provides a useful complement to Chapter 2, focusing attention clearly on the fact that market participation of smallholder producers as sellers is generally low in the Eastern and Southern African region, and that where it does occur it is usually into local markets which are not well integrated. Barrett develops a graphical explanation of the implications of his so-called 'double buffering effect', elaborating the theoretical findings with empirical evidence from the existing literature. In addition to the general message that households that are not participating in local markets and/or participating in local markets that are weakly linked to broader national or regional markets, are not likely to be affected by trade and price policy at the border level, a number of more specific insights are developed. Notable among these are the food price dilemma and the existence of poverty traps which create barriers to smallholders' entry to markets. Barrett concludes by proposing a three-pronged strategy for inducing greater levels of smallholder participation: macro-level trade and price policy for better resourced households selling into well-integrated markets, meso-level interventions to improve integration and micro-level interventions to assist poorer households to engage as sellers.

In the following chapter, Jo Swinnen, Anneleen Vandeplas and Miet Maertens examine how the governance of commodity chains can be improved to increase the levels of surplus available for a more equitable distribution to chain stakeholders. The authors develop a conceptual model which they use to demonstrate how governance structures are likely to differ as a consequence of the product characteristics and the institutional environment, particularly the functionality of markets and the level of contract enforcement, in which the chain actors operate. The extent of governance is demonstrated to be dependent upon the value added in the chain. Low-value commodities such as grains are shown to have weaker governance structures than chains developing fresh produce for export. However, the level and strength of governance is also demonstrated to be a critical determinant of both the amount of surplus and the equitability of its distribution. The authors argue that government interventions may be required to ensure an institutional environment in which governance can be strengthened in lower-value commodity chains, but that such interventions should be designed so as to minimize the chances of impeding private sector-led chain development.

This argument is supported by Chapter 5, in which Piero Conforti and Alexander Sarris focus on the relative importance of reductions in marketing margins as opposed to the further liberalization of trade. The authors develop a CGE model of the Tanzanian economy, placing particular attention on the significant marketing margins associated with the trade of agricultural products and on rigidities in the labour market. Having run various scenarios and associated sensitivity analyses, the authors conclude that interventions to reduce marketing margins would be a particularly efficient mechanism for reducing poverty levels. This is especially so when comparing margin reduction with the potential impact of further reductions in barriers to trade at the border, which do not appear to have significant effects in terms of improvements in GDP or in household welfare. Indeed, the point is made that tariff reductions have significant negative effects on government revenues.

Thom Jayne, Antony Chapoto and Jones Govereh (Chapter 6) provide a rich and wide-ranging review of the challenges facing food grain sectors in ESA, and facing policy makers attempting to formulate appropriate reforms and associated interventions. The chapter develops a context for discussion about the role of trade and market policy around a number of broad issues: the historical and political factors that constrain agricultural marketing and trade policy options; the chronic underprovision of public goods; how governments can make the demand for staple food more elastic and hence mitigate the price instability problem; the implications of the transition toward structural grain deficits; how the emerging biofuels industry will affect import parity prices in the region; the fact that a relatively small proportion of smallholder farmers will be able to benefit from a rise in regional food prices; why the rapid growth in urban food demand is being met by imported food; and how the rise of cassava production is likely to affect grain price stability. The authors argue that researchers need to devote greater attention to the implementation details of food marketing strategies if they are to provide accurate and meaningful guidance to policy makers.

Chapter 7, by Peter Little examines in detail the extent and possible ramifications of the significant volumes of unofficial cross-border trade. The chapter, while drawing on the author's significant research in livestock trade in Eastern Africa, draws a number of important insights relevant to other staple food marketing systems in the Eastern and Southern African region. Little begins by outlining the different views on the reasons for, and implications of, this often controversial trading activity. The chapter documents the extent of unofficial cross-border trade and the avenues through which it occurs, noting the different perceptions that are often found on opposite sides of the border. The effects, particularly on food security and the rural economy, are then examined and used to inform a discussion of policy options and challenges facing officials confronting the issue. A key conclusion is that unofficial cross-border trade is significant and often integral to the functionality of formal channels. As such a more holistic approach to the mitigation of the potential negative impacts associated with this type of trade is argued for.

In Chapter 8, Paul Dorosh, Simon Dradri and Steven Haggblade discuss the difficulties of ensuring the alignment of government, private sector and food aid agency intentions. Summing up the current misalignment, they state:

> Uncertainty about government intentions, coupled with the fear of being undercut by subsidized public sales, induces private grain traders to remain on the sidelines or to limit their exposure by bringing in only small lots. In response, governments complain that they cannot rely on the private sector to import adequate quantities of food in times of need. Where private traders and African governments fail to solve staple food supply problems themselves, food aid donors stand ready to fill the gap.

The authors suggest that the associated uncertainly significantly undermines incentives for private sector participation in the marketing system development. In response to this challenge, they develop an economic model, based on the Zambian situation, to assist the three categories of actors in assessing the impact of production shocks, predicting the response of the other actors and the potential consequences. On the basis of the model, a number of conclusions are drawn regarding the predictability of the use of trade policy in the context of fluctuating production levels.

The second set of chapters are based on a series of country case studies that were commissioned following the workshop, with a view to developing further some of the areas identified during the workshop as requiring further investigation. Essentially, the case studies drew together documented evidence on national trade and market policy objectives and assessed the performance of the current trade and domestic policy set in achieving these objectives. On the basis of that assessment, the relative merits of alternative policy interventions that may be required to overcome highlighted limitations in, or constraints faced by, current intervention strategies in achieving the objectives were examined. The case studies then discussed the key aspects of trade policy interventions that could support successful implementation of policy alternatives. The edited versions of the chapters attempt to draw out the key findings in a structure that facilitates comparison across the countries examined.

In the final chapter, Morrison and Sarris attempt to summarize the theoretical viewpoints and empirical evidence contained in the preceding chapters on the extent to which trade and associated domestic policy interventions might assist, or hinder, initiatives to develop the potential of the agricultural sector to contribute to longer-term economic growth and development. The chapter first summarizes the problematique in Eastern and Southern African grain markets in terms of weaknesses in its structure and recent performance. It then examines policy alternatives for addressing the problematique, drawing on the theoretical insights and case-study experience contained in the volume. It concludes by commenting upon practical issues related to policy intervention in the agriculture sector.

It is hoped that this volume, which is aimed at key stakeholders in the Eastern and Southern African grain markets, the policy analysts and decision makers who have the responsibility of formulating appropriate trade and market policy, and interested observers, will contribute to a more open and solidly grounded debate about the use of trade and related market policies in this sector.

2. Trade, agriculture and optimal commercial policy in Eastern and Southern Africa

Edward F. Buffie

1 INTRODUCTION

Successful agricultural development is critical to overall economic development and to meeting the ambitious targets for poverty reduction endorsed in the Millenium Development Goals. Nowhere is this truer than in Sub-Saharan Africa (SSA). In most of the region, agriculture employs 60 to 80 per cent of the labour force and is home to the great majority of the poor. The last 30 years have seen minimal gains, and in some cases marked declines, in agricultural productivity and food consumption per capita. Agricultural development has stalled even in countries like Zambia that have a potentially large comparative advantage in the production of basic foodstuffs.

Agriculture in Eastern and Southern Africa (ESA) has not been exempt from the movement towards more liberal trade policy. Export bans and taxes are much less common than in the past. Most countries have also phased out quotas and reduced tariffs to 10–25 per cent. The International Monetary Fund (IMF), the World Bank and trade negotiators for developed countries are pressing for further liberalization, but this appeal has encountered substantial resistance. The general perception among African policy makers is that trade liberalization has not delivered the benefits promised by its supporters and that priority should now be given to battling supply constraints in agriculture (United Nations, 2006).

The purpose of this chapter is to revisit the key issues relevant to the formulation of optimal agricultural trade policy in ESA. This is needed for at least two reasons. First, the pros and cons of interventionist trade policies look different in the light of theoretical and empirical research carried out in the last 15 years. Second, it is far from obvious that trade liberalization has served ESA well. While no one wishes to return to the days when effective rates of protection of 200 per cent were normal, the empirical record suggests that many less developed countries (LDCs) in SSA and elsewhere have not found the right point on the policy continuum.

In the next section the general theoretical guidelines for optimal trade policy and how they apply in the context of ESA will be discussed. Following this, Sections 3–5 evaluate arguments for protection based on concerns about food security, poverty, factor market distortions, and the viability of infant industries. The final section discusses what future research can do to promote a better-informed policy debate.

2 GENERAL GUIDELINES

Free trade is perhaps the most sacred cow in economics. Certain ground rules have to be respected therefore when constructing an argument against free trade. At a minimum, the argument must isolate the underlying source of market failure and explain how the proposed trade tax counteracts the distortion. If these requirements are met, a tariff or export subsidy/tax that is not too large will improve welfare. Demonstrating the potential for a welfare improvement is not sufficient, however, to validate the argument. In addition, a satisfactory rejoinder is needed to the Principle of Targeting, which asserts that the first-best solution is to follow free trade and correct the market failure with an appropriate tax or subsidy.

The Principle of Targeting rebuts many specious arguments for protection, but, contrary to conventional wisdom, it does not guarantee that free trade is always the first-best policy. Much depends on the nature of the distortion and on the point the country occupies on the development spectrum. To elaborate, consider a simple two-good trade model in which labour is the only variable input and a minimum wage law or unions fix the wage in sector m at a multiple of the wage in sector x. Imports of good m are subject to a tariff t, world prices equal unity, and L_i, Q_i and w_i denote employment, output and the wage in sector i. Assuming competitive firms, the model consists of the production functions:

$$Q_m = F(L_m), \tag{2.1}$$

$$Q_x = G(L_x), \tag{2.2}$$

the first-order conditions for the profit-maximizing levels of employment:

$$(1 + t)F' = w_m = w_x h, \;\; h > 1, \tag{2.3}$$

$$G' = w_x, \tag{2.4}$$

the market-clearing condition:

$$L_x + L_m = L, \tag{2.5}$$

and the private agent's budget constraint:

$$E(1 + t,u) = (1 + t)Q_m + Q_x + t[D_m(1 + t,u) - Q_m], \tag{2.6}$$

where t is the import tariff; u is utility; $E(\bullet)$ is the expenditure function; L is the fixed supply of labour; and $D_m(\bullet)$ is the compensated demand function for good m. Preferences are homothetic and tariff revenue, $t(D_m - Q_m)$, is rebated to the public as lump-sum transfers.

Solve (2.3)–(2.5) for L_i and w_x as a function of t. The solutions for L_m and L_x are:

$$dL_m = -dL_x = \frac{L_m L_x \beta_m \beta_x}{L_m\beta_m + L_x\beta_x}\frac{dt}{1 + t}, \tag{2.7}$$

where β_i is the elasticity of labour demand with respect to the wage in sector i. (β_i and all other elasticities are defined to be positive.) From (2.1)–(2.4),

$$(1 + t)dQ_m = w_x h dL_m, \tag{2.8}$$

$$dQ_x = w_x dL_x. \tag{2.9}$$

Differentiate (2.6) with respect to t, u, and L_i. After making use of (2.7)–(2.9), we obtain:

$$\frac{E_u}{E}(1 + t)\frac{du}{dt} = \underbrace{\frac{L_m\beta_m}{L_m\beta_m + L_x\beta_x}\frac{\beta_x\Omega}{1 + t(1 - c)}(h - 1 - t)}_{\text{Marginal benefit from increasing } L_m} - \underbrace{\frac{t\varepsilon c}{1 + t(1 - c)}}_{\text{Marginal cost of distorting consumer choice}}, \tag{2.10}$$

where c is the marginal propensity to consume good m; Ω is the ratio of wage payments in sector x to national income; and ε is the compensated own-price elasticity of demand for good m.[1] Because of the sectoral wage gap, L_m is below its socially optimal level at the free trade equilibrium. Thus a tariff that is not too large improves allocative efficiency by reducing real labour costs and increasing employment in the high-wage sector. This

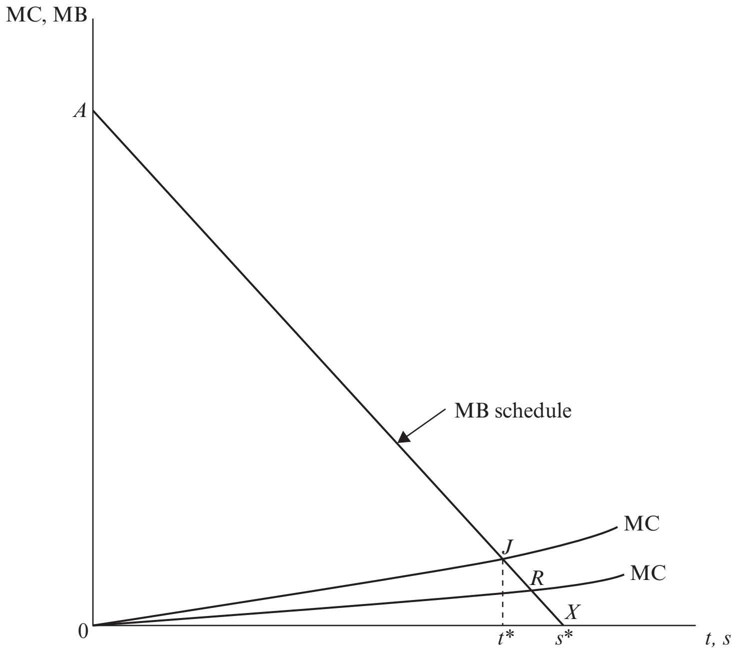

Figure 2.1 The optimal tariff versus the optimal wage subsidy

gain is tracked by the MB schedule in Figure 2.1. The marginal benefit decreases with the tariff, dropping to zero when $t = h - 1$ (implying $w_m/(1 + t) = w_x$) at point X.

While a tariff shifts employment in the right direction, it also distorts consumer choice by driving a wedge between the world and the domestic price for good m. The positively sloped MC schedule shows how the marginal cost of this distortion varies with the tariff. Observe that MC is zero at $t = 0$ and that the *compensated* elasticity of demand determines how fast MC rises with t.

Naturally the optimal tariff t^* is where marginal benefit equals marginal cost. The welfare gain equals $0AJ$, the area between the MB and MC schedules. Due to the byproduct distortion of consumer choice, it is not optimal to push the tariff to the level that fully eliminates the sectoral misallocation of labour.

The Principle of Targeting recommends attacking the distortion directly with a wage subsidy s. This changes equation (2.3) to:

$$F' = \frac{hw_x}{1 + s}. \qquad (2.3')$$

The subsidy reduces labour costs in the same manner as the tariff, so the MB schedule is the same. In the case where the mythical lump-sum tax is at the government's disposal, the optimal subsidy is $s^* = 0X$. Since there are no efficiency losses associated with imposition of the lump-sum tax, the subsidy fully neutralizes the labour market distortion. The welfare gain exceeds the gain under the optimal tariff by area $0JX$.

How much is lost in settling for the second-best solution? In general, not much. Empirical estimates of demand systems invariably find that compensated elasticities of demand are small at high levels of aggregation. Thus, when tariff coverage is fairly broad, the marginal cost of distorting consumer choice rises slowly as in Figure 2.1; t^* is then close to s^* and area $0JX$ is small relative to area $0AJ$. Moreover, in practice the wage subsidy will be financed by some type of distortionary tax. The welfare loss from the tax that adjusts in the background is captured by the MC_1 schedule. It is easy to show that MC_1 lies below MC (Dixit and Norman, 1980). The policy ranking does not change, but the margin of superiority for the wage subsidy – not large to begin with – decreases from $0JX$ to $0JR$.

It is a small step from a slim margin of superiority to none. For all of their faults, trade taxes are easy to administer. Tariffs incur lower collection costs than other taxes and avoid the disbursement costs associated with payment of explicit subsidies. Consequently, once administration costs are thrown into the mix, trade taxes can compete for the title of first-best policy (see Buffie, 2001). In fact, for some of the most important market failures that plague LDC economies, it may not be a close contest. When the Principle of Targeting calls for extensive output, wage and investment subsidies to correct production externalities, underemployment and underinvestment, the costs of safeguarding against fraud will often be so large as to render the 'first-best' policy package impractical.

These considerations carry special weight when the sector is agriculture and the country is from SSA. The empirical evidence indicates that the demand for food is highly price inelastic. This makes the MC schedule in Figure 2.1 very flat. Also, given the dearth of skilled labour in the public sector and the weaknesses of the region's information networks and social infrastructure, there is not much doubt that the administrative costs of fancy tax-subsidy schemes are much greater in SSA than in Asia or Latin America. This does not mean that any welfare-improving tariff justifies protection of agriculture. A great deal of information is required to judge whether protection is first best or close to first best. Sometimes tariffs involve multiple byproduct distortions; nor does the most direct policy intervention always incur large administrative costs. Policy rankings are inevitably case specific.

3 FOOD SECURITY AND POVERTY REDUCTION

Arguments for protection that appeal to concerns about food security are controversial. Certainly tariffs can increase domestic production of staple food crops. It is not obvious, however, that this enhances food security. Since most food products are tradable on world markets, food security depends on purchasing power of the poor, not management of domestic supply (World Bank, 2005). The debate usually centres therefore around the impact of protection on real income of different poor groups. Although the discussion is framed in terms of food security, the concept appears to be excess baggage. Variations in a group's food security are equated with variations in its real income. See, for example, Roberts et al. (2007).[2]

The Principle of Targeting advises a direct line of attack: combat poverty through transfer payments to the poor financed by higher taxes on the rest of the community. In support of this approach, one can cite examples of direct transfer schemes, such as Mexico's PROCAMPO programme, that have worked well. But programmes like PROCAMPO are probably not portable to Africa. Scaling up a PROCAMPO-type programme to fight rural poverty in SSA would entail large direct transfer payments to 50 per cent or more of the population. A tax-transfer scheme on this scale would demand considerable resources and be highly vulnerable to corruption.

The Usual Take on Protection and Poverty

Assuming that large-scale transfer payments are infeasible forces us to confront the question of how protection of agriculture affects the real income of the poor. The issue cannot be evaded by pointing to other policies that are effective in reducing poverty (for example, investment in social and physical infrastructure). Tariffs are easy to levy. If protection increases the real income of the poor, then it has a place in the government's anti-poverty programme.

The literature on this subject is vast, inconclusive and unsatisfying. It is also heavily slanted against protection. Typically the analysis emphasizes that higher food prices (i) do little to help poor farmers, who produce mainly for own consumption, and (ii) hurt all consumers, including landless labourers and the urban poor. Although poverty is overwhelmingly concentrated in agriculture, protection of agriculture either misses or harms the target groups.

Many discussions stop here. The better critiques recognize that landless labourers in agriculture may benefit from higher wages when food prices increase. But the point is then heavily qualified by the observation that anything can happen in general equilibrium: once the impact on other sectors is taken into account, it is not clear whether protection of agriculture raises overall demand for unskilled labour in the economy (McCalla and Nash, 2007). Related to this, when the analysis focuses on management of the supply chain, it is popular to bemoan the diversion of resources away from dynamic, labour-intensive non-traditional export- and import-competing industries, especially food processing (World Bank, 2003, 2005; McCalla and Nash, 2007; Roberts et al., 2007). The reader is left with the impression that protection of primary agriculture slows growth of labour demand, exacerbates underemployment, and is generally inimical to economic development.

All of this rests on shaky ground. Starting with the facts, there is not much support in the data for the view that food processing is labour intensive relative to the rest of the economy or to primary agriculture. In Tables 2.1a–b I have collected estimates of the labour intensity of production from various sources. According to these sources, food processing industries are *highly* capital intensive. The capital–labour ratio is 7 times greater than the capital–labour ratio for primary agriculture in Cameroon, 2.5 times greater in the Philippines, and 9 times greater in SSA. The numbers would decrease if land were added to capital, but the value-added share of labour is also much lower than in primary agriculture. Strikingly, in the GTAP data for SSA, the capital–labour ratio and the value-added share in food processing are on a par with those for chemical products.

The problems with the analytics stem from the lack of a suitable theoretical framework for investigation of how different protectionist schemes in agriculture affect labour demand and the distribution of income. To an outsider, the literature looks a bit schizophrenic. When the topic is sectoral growth and poverty, we hear that growth in agriculture does more to reduce poverty than growth in other sectors (Valdez and Foster, 2003). The reason is that production in agriculture is more intensive in unskilled labour than production in other sectors. But when the discussion turns to trade policy, there is a general reluctance to admit that protection of primary agriculture may reduce poverty. The favoured line is that employment will grow more rapidly and poverty decrease faster if policy promotes expansion of the food processing sector and a variety of non-traditional export industries. References to a few success stories (for example, exports of fresh fruits and vegetables by Chile) and the claim that production in these industries is generally labour intensive buttress the argument. In the case of food processing, however, the strategy promotes growth of a highly capital-intensive industry.

Why has the literature struggled to settle on a coherent bottom line? The complexity of the issue is only part of the answer. Fundamentally,

Table 2.1a Labour intensity of food processing and foodstuffs

Country/region	Sector	Capital–labour ratio	Value-added share of unskilled labour
	Foodstuffs	0.26	
	Cash crops	1.13	
Cameroon	Food processing	1.74	
	Miscellaneous industries	1.08	
Philippines	Agriculture	0.62[1]	
	Food processing	1.51[2]	
	Paddy rice		0.47
	Wheat		0.52
	Other grains		0.51
	Vegetables and fruit		0.48
	Sugar cane		0.44
World	Other crops		0.49
	Cattle, sheep		0.50
	Processed rice		0.26
	Sugar		0.30
	Vegetable oils		0.29
	Other food products		0.33
	Beverages and tobacco		0.19
	Cattle and sheep meat		0.42

Notes:
1. Simple average for 13 sectors.
2. Simple average for 8 industries.

Sources: Emini et al. (2006) for Cameroon; Cororaton et al. (2006) for the Philippines; and Global Trade, Assistance and Production project's GTAP5 Data Base for the World (https://www.gtap.agecon.purdue.edu/databases).

the analytical framework clashes with expert opinion; static trade theory simply does not support the claim that promotion of food processing and non-traditional export industries is the best path out of poverty.

In the next section it is argued that optimizing dynamic trade models provide a better conceptual paradigm. The gap between the recommended policy strategy and theory does not disappear in dynamic models, but it is much smaller than in static models. The richer specification of imports and the production structure also permits the analysis of additional, relevant schemes. For example, protection of both food staples and agro-industry

Table 2.1b Labour intensity of food processing vs. other sectors in SSA

Sector	Capital–labour ratio	Value-added share of labour[1]
Primary agriculture[2]	0.22	0.72
Processed rice	1.94	0.34
Meat products	2.59	0.28
Milk products	2.75	0.27
Other food products	2.23	0.31
Beverages, tobacco	2.40	0.29
Textiles	0.84	0.55
Pulp and paper	1.14	0.47
Other machinery	1.55	0.39
Chemical products	2.34	0.30
Trade, transport	1.22	0.45
Services	1.95	0.34
Dwellings	2.11	0.32
Construction	0.58	0.64

Notes:
1. Combined share of skilled and unskilled labour.
2. The numbers for primary agriculture appear to be the values for one crop that are repeated for all other crops in the GTAP5 Data Base for SSA.

Source: Global Trade, Assistance and Production project's GTAP3 Data Base (https://www.gtap.agecon.purdue.edu/databases).

is pointless in a static model but a potentially attractive strategy in a dynamic model.

A different view is the distribution of income in static versus dynamic trade models. Static and dynamic trade models reach different conclusions about how policy affects real wages and the distribution of income. In static models, moving up the supply chain in agriculture is the wrong strategy for fighting poverty: protection of the capital-intensive food processing sector increases the real capital rental and lowers the real wage, a result enshrined in the Stolper–Samuelson theorem. By contrast, many optimizing dynamic trade models suggest that production of capital-intensive industries benefits labour in the long run and possibly in the short and medium runs as well. Using trade policy to foster movement up the supply chain may be the right strategy *precisely because* food processing is highly capital intensive.

For illustrative purposes, a dynamic variant of the familiar Ricardo–Viner model is used here. Capital K and land T are specific factors in the import and export sectors, respectively. Factories are assembled by construction firms that import machines and hire labour. Imported machines serve as the numeraire, so increases in P_m and P_x refer to escalated structures of protection or export promotion. Primary agriculture is equated with the export sector and agro-industry with the import sector, but the designations are arbitrary. The import and export labels could be reversed, or both sectors could be import-competing. In the latter case, it is assumed that the import ratio is higher in agro-industry than in primary agriculture and that foreign aid (or an export enclave) finances imports of capital goods and the trade deficit in food.

Turning to the equations, the new production functions are:

$$Q_m = F(L_m, K), \tag{2.11}$$

$$Q_x = G(L_x, T). \tag{2.12}$$

Technology exhibits constant returns to scale. Thus the unit cost functions C^m and C^x link goods prices to the wage w, the capital rental r, and the land rental v:

$$P_m = C^m(w, r), \tag{2.13}$$

$$P_x = C^x(w, v). \tag{2.14}$$

The construction sector produces factories by putting one imported machine into a structure built by b workers. Since the price of imported machines equals unity, the supply price of capital is:

$$P_k = 1 + bw. \tag{2.15}$$

The equations for labour demand in sectors m and x are similar to (2.3) and (2.4):

$$P_m F_L = w, \tag{2.16}$$

$$P_x G_L = w, \tag{2.17}$$

but the full-employment condition now includes a term that relates employment in the construction sector to investment I:

$$L_x + L_m + bI = L. \tag{2.18}$$

Finally, the representative capitalist solves the problem[3]

$$\underset{\{E,I\}}{\text{Max}} \int_0^\infty V(P_x, P_m, E)e^{-\rho t}dt, \tag{2.19}$$

subject to:

$$E + P_k I = P_m F(L_m, K) - wL_m, \tag{2.20}$$

$$\dot{K} = I - \delta K, \tag{2.21}$$

where an overdot denotes a time derivative; ρ is the time preference rate; and δ is the depreciation rate. Preferences are homothetic and the indirect utility function $V(\bullet)$ summarizes how current utility depends on prices and total consumption expenditure E.

The Maximum Principle furnishes the necessary conditions for an optimum. These consist of:

$$V_E P_k = \phi, \tag{2.22}$$

$$\dot{\phi} = (\rho + \delta)\phi - V_E r, \tag{2.23}$$

where ϕ is the multiplier associated with (2.21) and in (2.23) we have made use of the fact that the marginal value product of capital equals the capital rental r.

The steady-state outcome

Across steady states, $\dot{\phi} = 0$ and $I = \delta K$. Imposing these conditions in (2.18) and (2.23) produces:

$$L_m + L_x + b\delta K = L, \tag{2.18$'$}$$

$$r = (\rho + \delta) P_k. \tag{2.23$'$}$$

The steady-state equilibrium defined by equations (2.13)–(2.17), (2.18′), and (2.23′) has a simple, recursive structure. From (2.15) and (2.23′),

$$\hat{r} = \alpha\hat{w}, \ \alpha < 1, \tag{2.24}$$

where $\alpha \equiv bw/P_k$, the cost share of labour in the production of capital goods, and a circumflex denotes the percentage change in a variable, that is, $\hat{x} = dx/x$. With r in hand, equations (2.13) and (2.14) can be solved for w and v:

$$\hat{w} = \frac{\hat{P}_m}{\theta_{mL} + \theta_K\alpha}, \tag{2.25}$$

$$\hat{v} = -\frac{\theta_{xL}}{\theta_T(\theta_{mL} + \theta_K\alpha)}\hat{P}_m + \frac{\hat{P}_x}{\theta_T}, \tag{2.26}$$

where θ_{ij} is the cost share of factor j in sector i. Equations (2.16), (2.17), (2.18′), and (2.25) now deliver the solution for K. To obtain concrete results, it is assumed that firms operate constant elasticity of substitution (CES) production functions. With CES technology,

$$\hat{L}_m = \frac{\sigma_m}{\theta_K}(\hat{P}_m - \hat{w}) + \hat{K}, \tag{2.27}$$

$$\hat{L}_x = \frac{\sigma_x}{\theta_T}(\hat{P}_x - \hat{w}), \tag{2.28}$$

where σ_m is the elasticity of substitution between capital and labour in sector m and σ_x is the elasticity of substitution between land and labour in sector x. Substituting the above solutions into (2.18′) leads to:

$$\hat{K} = \frac{L_m}{L_m + L_c}\left[\frac{\sigma_m(1 - \alpha)L_m\theta_T + \sigma_x L_x}{\theta_T L_m(\theta_{mL} + \theta_K\alpha)}\hat{P}_m - \frac{L_x\sigma_x}{\theta_T L_m}\hat{P}_x\right], \tag{2.29}$$

where $L_c = b\delta K$ is employment in the construction sector. There are no surprises in (2.29). Naturally, protection spurs capital accumulation, while an increase in P_x has the opposite effect.

It is instructive to compare the result in (2.25) with the outcome in the static model where K is fixed. In the static model,

$$\hat{w} = \frac{L_m\sigma_m\theta_T}{L_m\sigma_m\theta_T + L_x\sigma_x\theta_K}\hat{P}_m + \frac{L_x\sigma_x\theta_K}{L_m\sigma_m\theta_T + L_x\sigma_x\theta_K}\hat{P}_x. \tag{2.30}$$

We are interested in the impact on the real wage ω. This is w deflated by the consumer price index (CPI), namely:

$$\omega \equiv \frac{w}{P_x^{1-\gamma}P_m^{\gamma}}, \Rightarrow \hat{\omega} = \hat{w} - (1 - \gamma)\hat{P}_x - \gamma\hat{P}_m, \tag{2.31}$$

where γ is the consumption share of good m. I treat $\sigma_m = \sigma_x = \sigma$ as the neutral benchmark case. In this case, an increase in P_m reduces the real wage if and only if:

$$\frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K} < \gamma,$$

or

$$\frac{L_m}{L_x}\frac{1-\gamma}{\gamma}\frac{\theta_T}{\theta_K} < 1. \tag{2.32}$$

Now:

$$\frac{L_m}{L_x}\frac{1-\gamma}{\gamma} = \frac{\theta_{mL}}{\theta_{xL}}\frac{1+\psi_x}{1+\psi_m},$$

where ψ_i is the ratio of net imports to domestic production in sector *i*. Thus the condition in (2.32) may be written as:

$$\frac{\theta_{mL}(1-\theta_{xL})}{\theta_{xL}(1-\theta_{mL})}\frac{1+\psi_x}{1+\psi_m} < 1. \tag{2.32$'$}$$

Similar manipulations establish that the above condition is necessary and sufficient for an increase in P_x to raise the real wage.

Since the import ratio is higher in sector *m*, $\theta_{mL} < \theta_{xL}$ is sufficient for (2.32′) to hold. Consistent with the intuition familiar from static trade models, the real wage decreases when protection induces a shift of resources towards the less labour-intensive sector. Conversely, an export subsidy raises the real wage by promoting expansion of labour-intensive primary agriculture.

These results get overturned in the dynamic model. From (2.27) and (2.31),

$$\hat{\omega}/\hat{P}_m = \frac{\theta_{mL}(1-\gamma) + \theta_K(1-\gamma\alpha)}{\theta_{mL} + \theta_K\alpha} > 0,$$

$$\hat{\omega}/\hat{P}_x = -(1-\gamma) < 0.$$

A tariff strengthens labour demand by increasing the capital stock. Regardless of whether the import sector is a little or much less labour intensive than the export sector, the capital stock rises enough to increase the wage relative to both P_m and the CPI ($\hat{w} > \hat{P}_m$). The opposite occurs when P_x increases. Layoffs associated with capital decumulation in the import sector neutralize the favourable effect of expansion in the labour-intensive export sector. In the long run, *w* is unchanged, so workers are worse off if they consume any of the exportable good.

The transition path

The results in the static and dynamic models diverge at some point on the transition path to the new stationary equilibrium. We need to determine whether this happens early or late in the adjustment process in order to judge the relevance of the dynamic effects. In the case of a tariff, for example, it would be disappointing if it took 63 years for growth in the capital stock to pull the real wage above its original level.

To develop the dynamics in terms of investment and the capital stock, differentiate (2.20) and (2.22) with respect to time and substitute for $\dot{\phi}$ from (2.23). This gives:

$$-\frac{P_k}{\tau}\frac{\dot{E}}{E} + P_k\alpha\frac{\dot{w}}{w} = (\rho + \delta)P_k - r, \tag{2.33}$$

$$\dot{E} = r\dot{K} - (wL_m + P_k\alpha I)\frac{\dot{w}}{w} - P_k\dot{I}, \tag{2.34}$$

$$\Rightarrow P_k\dot{I} + [wL_m + \alpha(P_kI + \tau E)]\frac{\dot{w}}{w} = r\dot{K} + \frac{E\tau}{P_k}[(\rho + \delta)P_k - r], \tag{2.35}$$

where $\tau \equiv -V_E/V_{EE}E$, the intertemporal elasticity of substitution. On the transition path, w and r vary with K and I. From (2.13), (2.18), (2.27) and (2.28),

$$\hat{w} = \frac{L_m}{Kh}dK + \frac{b}{h}dI, \tag{2.36}$$

$$\hat{r} = -\frac{\theta_{mL}}{\theta_K}\left(\frac{L_m}{Kh}dK + \frac{b}{h}dI\right), \tag{2.37}$$

where:

$$h = \sigma(L_m/\theta_K + L_x/\theta_T).$$

After substituting for $\dot{K}$ and $\dot{w}$, (2.35) becomes:

$$\left\{P_k + \left[wL_m + \alpha(P_kI + \tau E)\right]\frac{b}{h}\right\}\dot{I} = \left\{r - \left[wL_m + \alpha(P_kI + \tau E)\right]\frac{L_m}{Kh}\right\}$$

$$(I - \delta K) + \frac{E\tau}{P_k}[(\rho + \delta)P_k - r]. \tag{2.38}$$

Equations (2.21) and (2.38) constitute a self-contained system of two differential equations in I and K. Linearizing these two equations around the stationary equilibrium (K^*, I^*) yields:

$$\begin{bmatrix}\dot{I}\\ \dot{K}\end{bmatrix} = \begin{bmatrix}a_1 \; a_2\\ 1 - \delta\end{bmatrix}\begin{bmatrix}I - I^*\\ K - K^*\end{bmatrix}, \tag{2.39}$$

where:

$$a_1 = \frac{n_1 b/h + n_2}{1 + \alpha L_m f/h},$$

$$a_2 = \frac{n_1(L_m/Kh) - \delta n_2}{1 + \alpha L_m f/h},$$

$$n_1 = \frac{E\tau(\rho + \delta)}{P_k}\left(\alpha + \frac{\theta_{mL}}{\theta_K}\right),$$

$$n_2 = (\rho + \delta)\left(1 - \frac{\theta_{mL}L_m f}{\theta_K h}\right),$$

$$f = 1 + \frac{\alpha\theta_K(\delta + \rho\tau)}{\theta_{mL}(\rho + \delta)}.$$

The determinant of the coefficient matrix is negative. Hence the steady state is a saddle point with a unique convergent path to the long-run equilibrium. On the convergent path,

$$I(t) - I^* = (\lambda + \delta)(K_o - K^*)e^{\lambda t}, \tag{2.40}$$

$$K(t) - K^* = (K_o - K^*)e^{\lambda t}, \tag{2.41}$$

where an o subscript indicates the initial value of a variable and:

$$\lambda = \frac{a_1 - \delta - \sqrt{(a_1 - \delta)^2 + 4(a_2 + a_1\delta)}}{2}$$

is the system's negative eigenvalue.

The first quadrant in Figure 2.2 depicts the dynamic system in (2.39). The capital stock rises at points to the left of the KK schedule, where net investment is positive, and falls at points to its right. Gross investment is constant at points on the II schedule. Under plausible conditions, both II and SS are negatively sloped.[4]

In the second quadrant, the WW schedule tracks the path of ω. WW is defined for given values of P_m and P_x, and its slope reflects how joint variations in I and K on the saddle path affect labour demand and the real wage. To construct the schedule, first write the solution for I as:

$$I(t) - I^* = (\lambda + \delta)[K(t) - K^*]. \tag{2.40$'$}$$

From (2.36) and (2.40′),[5]

$$\left.\frac{\omega(t) - \omega^*}{K(t) - K^*}\right|_{WW} = \frac{\omega}{h}\left[\frac{L_m}{K} + b(\lambda + \delta)\right] > 0.$$

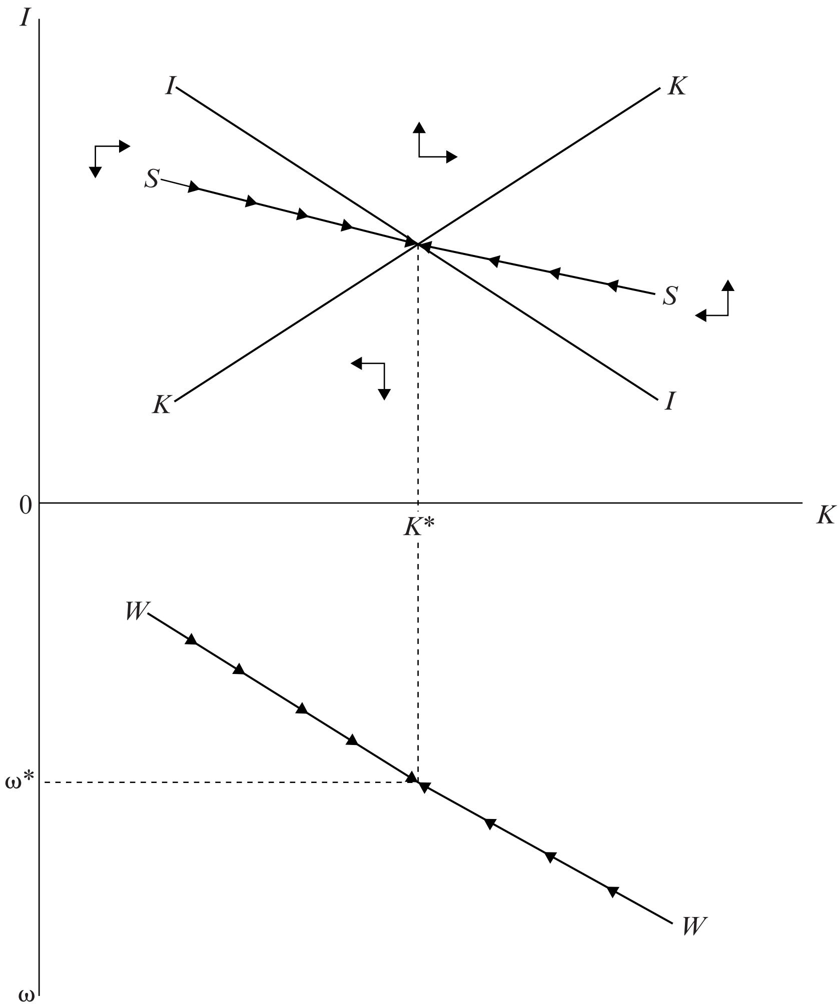

Figure 2.2 The adjustment process in the dynamic Ricardo–Viner model

Brute force algebra establishes that WW slopes upward. Thus, after jumping at $t = 0$, the real wage moves in the same direction as the capital stock.

An import tariff

Figure 2.3 shows the outcome for an import tariff. The initial equilibrium is at (A, B) and the new steady state is at (C, D). In the very short run, I jumps upward while K remains fixed. The jump in investment increases employment in the labour-intensive construction sector. Consequently, the real wage may increase *immediately*:

$$\hat{\omega}(0) = \left(\frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K} - \gamma\right)\hat{P}_m + \frac{b}{h}[I(0) - I^* + \underbrace{(I^* - I_o)}_{\delta(K^* - K_o)}]. \tag{2.42}$$

The first term is the solution from the static variant of the model. Its sign is negative on the assumption that the export sector is more labour intensive than the import sector. The overall sign, however, depends on how this effect compares with the increase in labour demand in the construction sector. In Figure 2.3 where investment overshoots its steady-state level [$I(0) > I^*$],

$$\frac{b\delta K_o}{h}\frac{K^* - K_o}{K_o} > \gamma - \frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K}$$

is sufficient for the boom in the construction sector to dominate. Substitute for $(K^* - K_o)/K_o$ from (2.29). After simplification, we have:

$$\frac{L_c}{L_m + L_c}\frac{(1-\alpha)L_m\theta_T + L_x}{L_m\theta_T(\theta_{mL} + \theta_K\alpha)} > \left(\frac{1}{\theta_K} + \frac{L_x}{L_m\theta_T}\right)\left(\gamma - \frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K}\right). \tag{2.43}$$

Experimentation with alternative parameter values shows that the above condition is not very stringent.[6] It holds comfortably, for example, when $\alpha = 0.50$, $\delta = 0.05$, $\theta_K = 0.60$, $\theta_T = 0.40$, $\rho = 0.10$, $\gamma = 0.20$, and $\psi_m = 1$. (ψ_m is the ratio of imports to domestic production in sector m.) The term on the left side is then almost double the value of the term on the right side (9.89 versus 5.48).[7] In this and many other plausible cases, the real wage is continuously higher on the transition path – the qualitative results in the static model do not hold *at any time horizon*.

An export subsidy

In the long run, landowners reap all of the gains from higher export prices as w and r remain constant across steady states. Figure 2.4 portrays the adjustment process. An increase in P_x lowers the equilibrium capital stock, causing I to decline at $t = 0$. When:

$$\frac{L_c}{L_m + L_c}\frac{L_x}{L_m\theta_T} > \left(\frac{1}{\theta_K} + \frac{L_x}{L_m\theta_T}\right)\left(\gamma - \frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K}\right) \tag{2.44}$$

the real wage declines on impact as layoffs in the construction sector swamp the positive effects in the purely static model. If the condition in

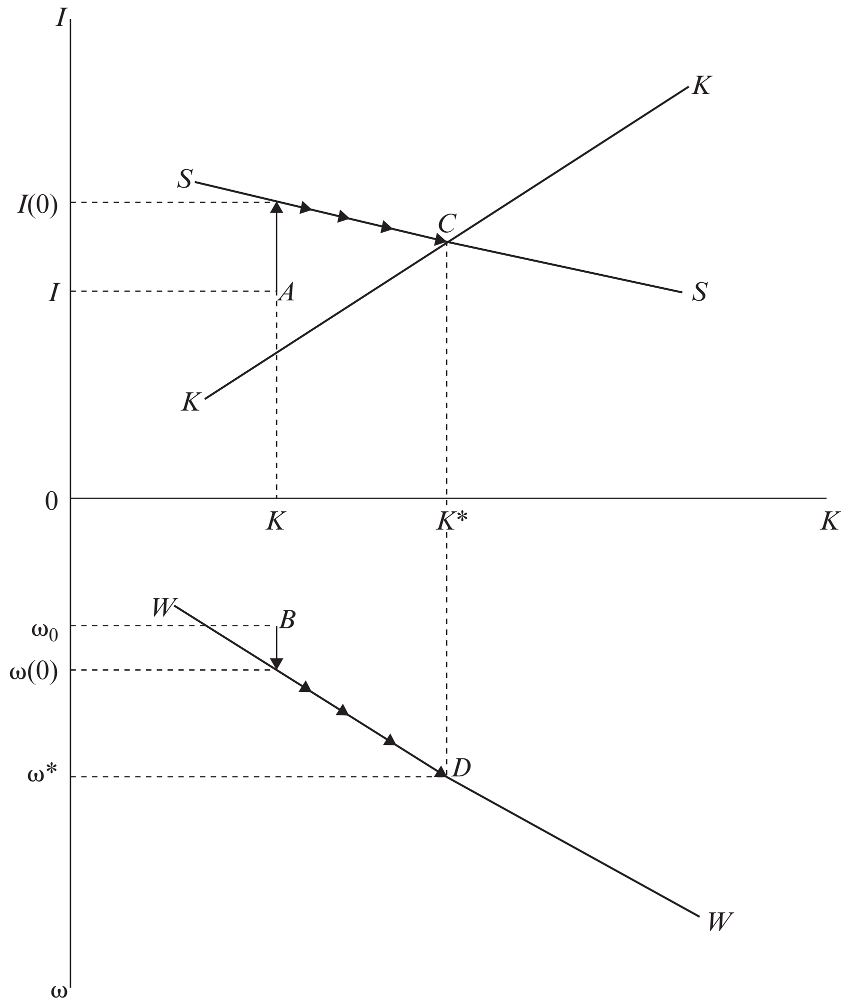

Figure 2.3 The transition path when P increases and the condition in (2.43) holds

(2.44) does not hold, the real wage is higher until the capital stock drops below K_1 (see Figure 2.4).

Other scenarios

So far I have assumed that the government spends the tariff revenue on purchases of either the export good or the import good. If it spent the revenue on infrastructure investment instead, the real wage would be more

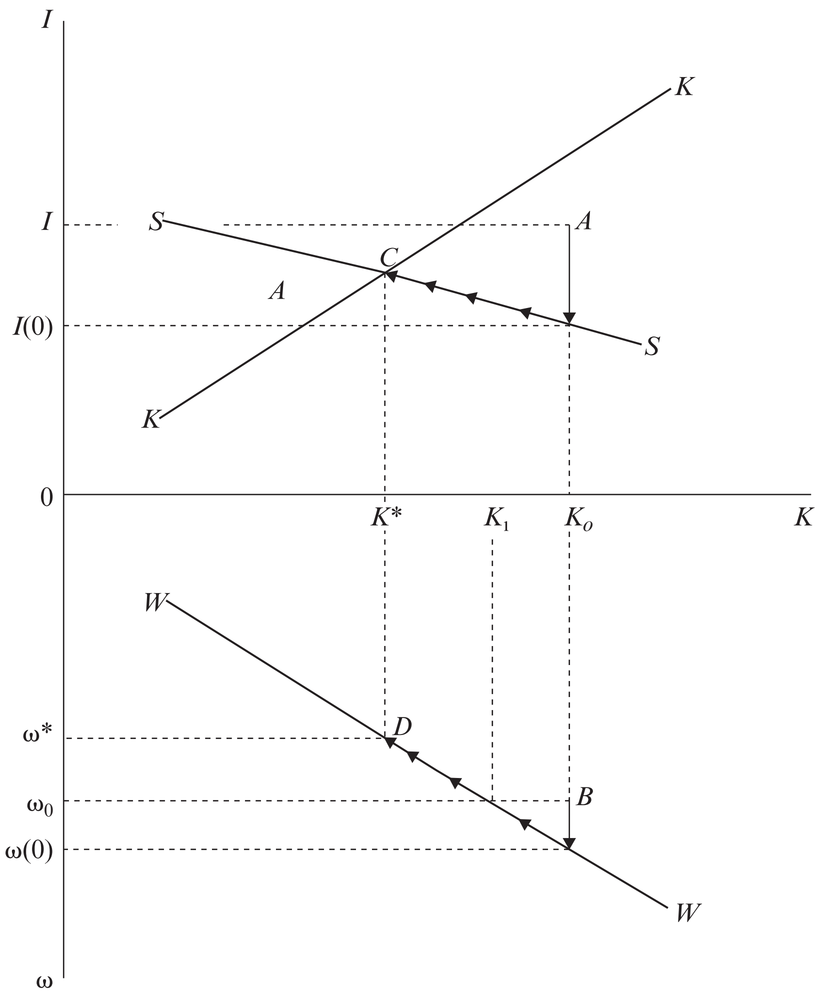

Figure 2.4 The transition path when P increases and the condition in (2.44) does not hold

likely to increase at $t = 0$ as the boom in the construction sector would be stronger. Furthermore, since greater availability of infrastructure raises the return to private investment, the real wage and the private capital stock would increase more across steady states.

It is also of interest to examine combined changes in P_m and P_x. Consider a policy package that raises the two prices proportionately. Obviously, there is no change in the real wage or sectoral employment in the static model. (Proportionate increases in w, P_m and P_x preserve the initial real equilibrium.) There are real effects in the dynamic model, however, because the relative price of imported machines falls. Since investment increases, new hiring in the construction sector *guarantees* that the WW schedule shifts upward. The real wage is higher therefore at every point on the transition path. Formally,

$$\frac{\omega(t) - \omega_o}{\omega_o} = [\delta b + (L_m/K)(1 - e^{\lambda t}) - \lambda b e^{\lambda t}]\frac{K^* - K_o}{h}, \qquad (2.45)$$

with

$$\frac{K^* - K_o}{K_o} = \frac{L_m}{L_m + L_c}\sigma(1 - \alpha)\left[1 + \frac{L_x\theta_K}{\theta_T(\theta_{mL} + \theta_K\alpha)}\right]\hat{P}_m, \qquad (2.46)$$

$$\frac{\omega^* - \omega_o}{\omega_o} = \frac{\theta_K(1 - \alpha)}{\theta_{mL} + \theta_K\alpha}\hat{P}_m. \qquad (2.47)$$

The solutions in (2.46) and (2.47) incorporate the negatively signed terms involving $\hat{P}_x$ in (2.29) and (2.31). Thus security guarantee comes at a price: $\omega(t) > \omega_o$, $\forall t$, irrespective of sectoral differences in the labour intensity of production; but, in the long run, the real wage and the private capital stock increase less compared to the case where only P_m rises.

There is another potential drawback. Financing joint protection may be a problem when the scheme combines a tariff with an export subsidy. In an economy with balanced trade, exports equal imports of consumer goods and capital goods. Revenue from a tariff on consumer imports (more generally on consumer imports plus imported intermediate inputs) is insufficient therefore to cover the cost of the export subsidy. But balanced trade is more the exception than the rule in ESA. In most of the region, persistent large aid inflows allow imports to exceed exports by 5 to 15 per cent of GDP. If aid inflows pick up the bill for imported machinery and equipment, then a tariff on consumer imports generates enough revenue to pay for the export subsidy. Balanced import substitution plus export promotion is self-financing.

In the case where aid flows are 'small', the revenue shortfall can be dealt with by reducing the export subsidy. For some $\hat{P}_x < \hat{P}_m$, the real wage is unchanged at $t = 0$. ($K^* > K_o$, but the WW schedule stays put.) Since the export subsidy is less than the tariff, the scheme has a chance to be self-financing. The outcome turns on the exact numbers for the ratio of exports to non-capital goods imports, for factor intensity rankings, and for the parameters that determined the initial response of private investment (for example, the intertemporal elasticity of substitution).

Suggestions for a New Research Programme

Needless to say, I am not selling the stylized model above as the right model for policy analysis. I have investigated the properties of the model for two reasons. First, the mechanisms highlighted by the model play an important role in more complicated and more realistic models (see Buffie, 2001, ch. 5). Second, because the model is so simple, it is easy to demonstrate that neglecting dynamic effects strongly conditions the results. I hope this convinces the reader that the literature on trade policy and agricultural development should pay more attention to dynamic models. Hertel and Winters (2006, p. 7) are quite wrong, I believe, when they assert that 'most of the issues that arise in the popular debate over the impacts of trade policy [on poverty] are fundamentally comparative static in nature'.

Dynamics have been incorporated into GTAP, Linkage, and other large CGE models of agriculture and trade. But the dynamics are not grounded in rigorous theory. The models either import assumptions about how factor supplies and productivity growth evolve or rely on ad hoc specifications of saving and investment. If the policy debate is to be better informed, we need more input from medium-sized dynamic trade models in which private agents solve explicit intertemporal optimization problems. I suggest, more specifically, work on a set of first-generation models built along the following lines:

1. *Four sectors: industry, primary agriculture, food processing and services/nontradables* Inclusion of a food processing sector permits analysis of policies that affect the supply chain. A non-tradables sector is needed both for realistic calibration of the model and to capture important general equilibrium interactions mediated through changes in the real exchange rate.
2. *Four factors of production: sector-specific capital, skilled labour, unskilled labour and land* Short-run supply responses are implausible unless capital is sector specific. Accurate mapping of the distributional effects requires the labour input to be split between skilled and unskilled labour.
3. *Publicly supplied infrastructure in the production functions for primary agriculture and food processing* As noted in the subsection 'Other scenarios', when thinking about strategies for poverty-reducing growth, it is desirable to earmark tariff revenue for investment in infrastructure. With a little creativity, it may also be possible to gain some insight into the notion that preparatory 'behind-the-border' investments are needed to unleash the growth potential of food processing and nontraditional export industries (World Bank, 2005).

4. *Heterogeneous agents* The trajectory of investment spending and the pace of capital accumulation exert a strong influence on the distributional outcome in the short and medium runs. This argues for a model that treats capitalists in each sector as separate agents who solve distinct optimization problems. The canonical representative agent model assumes that wide, deep financial markets pool savings of different agents, which is scarcely credible for LDCs. A representative agent model with sector-specific capital captures a lot, however, so there is room for disagreement on this point.
5. *Segmented, dualistic labour markets? Limited intersectoral labour mobility in the short run?* Question marks are attached because the right specification of the labour market is country specific. When the labour market is dualistic, the distributional outcome depends not only on how earnings of the poor change in agriculture but also on the number of jobs created or destroyed in the high-wage formal sector. For some issues, it may also be important to model the process that determines how fast labour relocates from one sector to another.

4 LEARNING EFFECTS AND THE INFANT INDUSTRY ARGUMENT

The classic infant industry argument (IIA) asserts that firms become more efficient as they become more experienced. Early in life, the firm is unable to compete against imports without protection. Over time, however, it learns its trade and reduces costs. When the learning process is complete, costs are low enough that the firm can turn a profit while selling at the world price. The emergence of a new, internationally competitive industry then raises real income. Viewed over the whole cycle, temporary protection is welfare improving provided that the present value gains reaped after the industry is mature exceed the present value losses incurred during the learning phase.

This version of the IIA lacks an effective rejoinder to the Principle of Targeting. If the firm truly has good long-term prospects, it should have no qualms about borrowing to cover transitory losses during the infancy phase. Of course, the firm's application for a loan may be denied on the grounds that its proposed investment project is too risky.[8] But the solution to this problem is simple: the government should lend directly to the firm or provide a loan guarantee so that it can qualify for credit from commercial banks. The loan guarantee is costless to administer (it should not be necessary to act on the guarantee) and, in contrast to a tariff, it corrects the underlying market imperfection without distorting consumer choice or encouraging inefficient firms to enter the industry. It is reasonable to worry that the government will make mistakes and pick chronic losers as often as it picks winners. But the underlying premise of the argument is that the government has better information than private lenders. If this disappears, there is no case for loan guarantees, protection or any other policy intervention. For all practical purposes, the market equilibrium is constrained Pareto efficient.

The Modern Version of the Infant Industry Argument

The modern version of the IIA does not suffer from the weaknesses of the classic version. In the modern version, learning effects are external instead of internal to the firm. This difference is critical. External learning effects may give rise to multiple equilibria (Krugman, 1991) and the coordination problem illustrated in Figure 2.5. The representative firm contemplating entry faces the long-run marginal cost schedule MC. Acting in isolation, the firm sees only losses when it has to sell at the world price P^*. But if all firms entered simultaneously, learning effects would shift each firm's marginal cost schedule to MC_1, making it profitable to produce Q^*. The coordination problem can be resolved by imposing a tariff that makes it profitable for each firm to produce even when all other firms do not. A production subsidy also solves the coordination problem but is not necessarily first best: higher administration costs have to be balanced against the 'little triangle' benefit of allowing consumers to buy at free trade prices.

Knowledge spillovers of some sort underlie the external effect. Usually these are interpreted as spillovers of information about technical processes and product design. But other spillovers are potentially important, especially the 'market opportunity' spillover analysed by Hoff (1997) and Hausmann and Rodrik (2003). In Hoff's model, an externality arises from the interaction of limited markets for sharing risk with imperfect information about the viability of a prospective new industry. The first group of bold firms that enter the industry serve as 'data producers' (the term is from Joseph Schumpeter) for other firms. They provide information through the success/failure of their ventures that reduces uncertainty for future entrants. The initial entrants, however, cannot appropriate the social value of the information they generate: once it becomes known that success is possible, new firms enter and compete away rents by bidding up wages or lowering prices (if the price is not fixed by the world market). Consequently, entry into the industry is suboptimal. In fact, entry may never occur; the economy may plod along dully, stuck in a no-learning equilibrium.

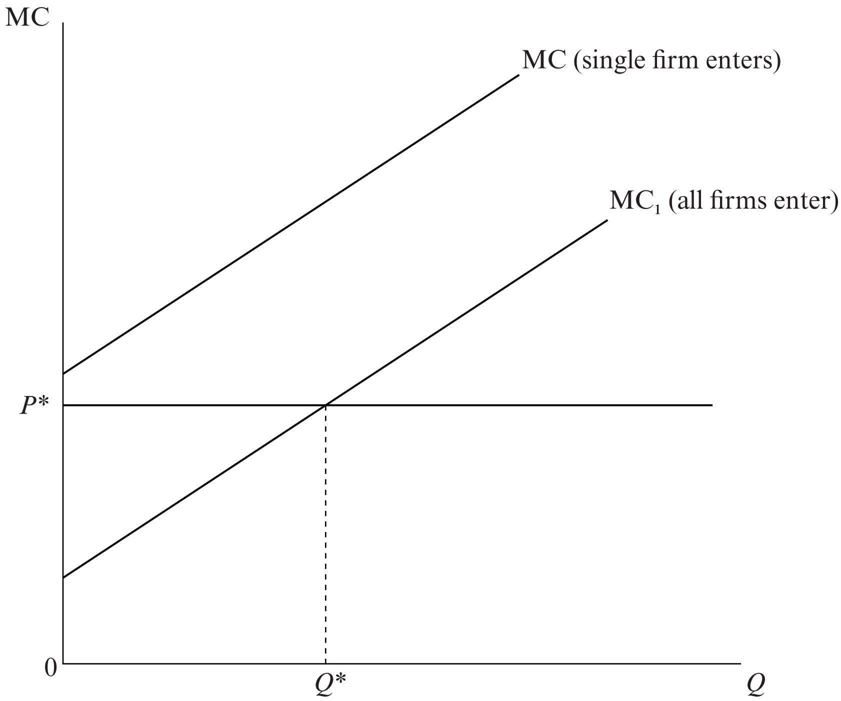

Figure 2.5 External learning effects and the coordination problem

Empirical Evidence of Learning Effects

There is scant evidence of learning effects that support the modern version of the IIA. For import-competing industries, we have only anecdotal accounts from case studies. The conclusions are mixed and it is generally unclear whether the purported learning effects are external or internal to the firm. Interestingly, however, a few case studies have found evidence suggestive of learning externalities in smallholder African agriculture (see the discussion in Bardhan, 2007).

Most of the recent literature has concentrated on estimation of learning effects in export industries. The raw data invariably show that exporters are larger, more productive, and pay higher wages than non-exporters in the same industry. The strong correlation between productivity and exporting is compatible with the hypothesis that firms gain access to valuable technical information when they participate in international markets. But it might reflect nothing more than self-selection; since production for the world market entails fixed costs, exporting is profitable only for firms that achieve a minimum threshold level of efficiency. Thus support for the learning-by-exporting (LBE) hypothesis requires evidence that the productivity gap between exporters and non-exporters *continues* to widen (at least for a while) after firms first enter the export market. In principle, firm-level panel datasets allow construction of tests that separate learning effects from self-selection.

We now have results for LDCs in East Asia, Latin America and Africa. The majority of the tests do not support the LBE hypothesis. A minority do, however, including those undertaken for SSA. The studies for SSA also stand out in finding *large* learning effects (see Appendix Table 2A.1). There are inference problems in two of the studies, but, overall, the weight of the findings is that learning effects operate more strongly in SSA than in other parts of the Third World, perhaps because African firms are further behind best-practice technology. Unfortunately, none of the studies for SSA attempts to distinguish between internal and external learning effects. At present, the evidence for external learning effects is confined to two industries (food processing and leather products) in one country (Morocco) in one study (Clerides et al., 1998).

Summing up, the IIA for protection of primary agriculture and agro-processing remains highly speculative. The results in van Biesebroeck (2003), Bigsten et al. (2004) and Mengistae and Pattillo (2004), support only a very weak second-best argument for protection. As yet, there is no hard empirical evidence of learning externalities that might justify protection as the first-best policy response. But technology spillovers are not the only rationale for infant industry protection. Recall Hoff's version of the IIA. The social benefit conferred by the information externality takes the form of a better intersectoral allocation of resources. Evidence of productivity spillovers would validate the best-known and most popular version of the IIA; it is irrelevant, however, to Hoff's argument that protection is warranted for infant industries in which initial entrants generate socially valuable information about new market opportunities.

5 FACTOR MARKET DISTORTIONS

Distortions that cause underemployment and underinvestment affect major allocative decisions in many industries. They are capable therefore of justifying protection or export promotion at the broad sectoral level. Other factor market distortions matter but carry much less weight in the design of optimal commercial policy.

Underemployment

Labour market distortions are pervasive in ESA. Multiple factors interfere with the wage-setting process and an efficient sectoral allocation of labour:

1. To varying degrees, unions, payroll taxes, restrictions on layoffs, minimum wage laws and mandatory severance pay make labour more expensive in the formal sector than in the informal sector. South Africa occupies a category all of its own. Powerful unions and generous social welfare payments – a political necessity after 1994 – have kept wages far above market levels and severely distorted the labour–leisure choice for a large part of the workforce. By most accounts, the open unemployment rate is truly 20–25 per cent.
2. Firms in various branches of the formal sector, including non-traditional export industries and food processing, appear to pay efficiency wages.[9] The wage premium is not necessarily a compensating differential for working harder. In industries where it is difficult to monitor an individual employee's performance, firms face an incentive to pay an above-average wage to motivate workers to put out a respectable amount of effort. No similar incentive operates in the informal sector, where firms are generally small and monitoring is comparatively easy. Due to the differences in monitoring technology, there is no presumption that the formal–informal sector wage gap overstates the welfare gain from reducing underemployment. Theory does not rule out the possibility that work in the formal sector is both better paid and less onerous than in the informal sector.
3. The absence of well-defined property rights in agriculture conflates the return to work with rents from land ownership. This impedes labour mobility as smallholders forfeit their claims to land and its rents when they work outside of agriculture. Putting a number to the effect is difficult, but the evidence from case studies for China and Chile suggests that it is important. In both countries, the resolution of land tenure issues was a crucial component of reforms that facilitated the rapid transfer of labour from traditional agriculture to non-traditional export- and urban-based industries (Valdez and Foster, 2003; Zhai and Hertel, 2006).

Underinvestment

Most of the factors that cause underinvestment can be explained with the aid of Figure 2.6.

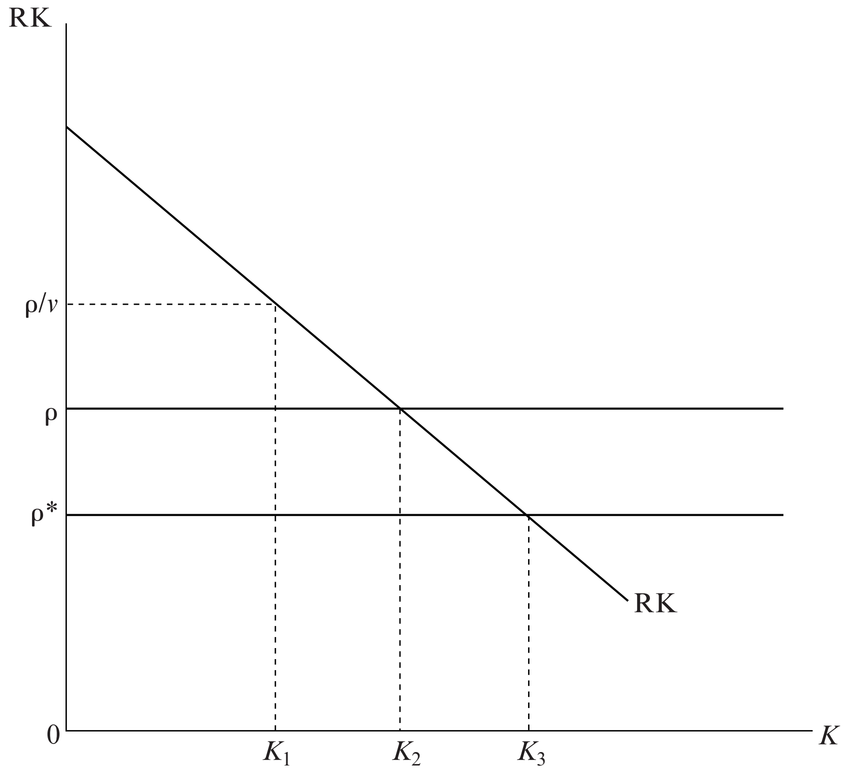

Figure 2.6 Factors that cause underinvestment

The two horizontal lines correspond to the private and social rates of time preference (ρ and ρ*, respectively), while the RK schedule shows the return to capital net of depreciation. The socially optimal capital stock, K_3, is the value of K at which the return equals ρ*.

Owners of private capital invest until the return they receive equals ρ. If the private and social time preference rates were the same, the socially optimal capital stock would be K_2. The market would deliver this amount of capital as long as private owners claimed the entire return on their investments. But share tenancy, communally owned land, insecure property rights, and taxation all limit the private return to vRK, $v < 1$. As a result, capital accumulation stops at K_1, where RK $= \rho/v$. Investment is suboptimal.

Even if nothing drives a wedge between the social and private return, saving and investment will be too low whenever the social time preference rate is less than the private rate. While the two rates may diverge for several reasons, the best explanation is supplied by Sen's (1967) isolation paradox. Briefly, the paradox occurs when there is a widely shared desire to help future generations that goes beyond the desire to help just one's own descendants. In this situation, everyone would be willing to save more as part of a social contract. A collective agreement increases national saving enough to affect the welfare of the entire next generation, something no individual other than Bill Gates can achieve acting on their own. But a decentralized market economy cannot coordinate savings decisions in this manner. As Feldstein (1964, p. 367) observes, 'the market cannot express the "collective" demand for investment to benefit the future'. In Figure 2.6, this unsolved collective action problem increases the gap between the *laissez-faire* capital stock and the socially optimal capital stock from $K_2 - K_1$ to $K_3 - K_1$.

A third factor is important. Lack of credit for agricultural smallholders is a severe, refractory problem. It forces most projects to be financed by smallholders' own saving, thereby increasing the time required for the capital stock to travel to its profit-maximizing level. Credit constraints also preclude investment in highly profitable but lumpy projects that require large initial outlays.

Policy Implications

The Principle of Targeting argues that underemployment and underinvestment should be attacked with investment and employment subsidies financed by taxes that do not interfere with free trade. By now, the counterargument is familiar: given the magnitude of the distortions, the requisite subsidies are too large to be practical; and even if they were, high administrative costs undercut the claim that the scheme is first best.

When developing guidelines for trade policy, much depends on the relative severity of the two distortions. At a free trade equilibrium, the transfer of labour from the informal to the formal sector raises real GDP (measured at world prices) by the amount of the sectoral wage gap. Labour market distortions thus favour promotion of manufacturing and agro-industry relative to primary agriculture. On the other hand, the market imperfections that cause underinvestment operate in practically every sector. This implies that trade policy should be structured so as to lower the real price of imported capital goods throughout the economy. In general, therefore, the prevalence of underemployment and underinvestment argues for an escalated structure of protection *and* export promotion, with low duties on imported capital goods and intermediate inputs.

6 CONCLUDING REMARKS

Although the infant industry argument is highly speculative, an intellectually respectable case can be made for using trade policy to combat poverty, underemployment and underinvestment. There is a presumption, based on the results in Buffie (2001), that the optimal trade regime will be characterized by *moderate* escalated structures of protection and export promotion. Much more work needs to be done, however, on medium-sized dynamic trade models with a detailed representation of the agricultural sector as it appears in SSA. The payoff promises to be large. Research on fully articulated dynamic models is essential to counter the objection that the impact of trade policy on welfare is small (an embarrassing problem in static models), to get the *sign* and the time profile of distributional effects correct, and to proper analysis of important intertemporal distortions such as underinvestment. Dynamic models also provide the right framework for investigation of adjustment problems associated with trade liberalization and for the analysis of various issues that arise at the intersection of trade and macroeconomic policy.

The alternative to research on dynamic agricultural trade models is further refinement of large static models. At this point, however, the marginal return to crunching numbers for another CGE trade model with 40–100 sectors is low, bordering on negligible. The policy debate has grown stale. It needs to be enlivened by fresh results and a new conceptual paradigm.

NOTES

1. To derive (2.10), note that $\partial E/\partial(1 + t) = D_m$, that $c = [1 + t(\partial D_m/\partial u)]/E_u$, and that the marginal propensity to consume good m equals its consumption share under homothetic preferences. (When preferences are not homothetic, c in the second term on the right side in (2.10) is replaced by the consumption share.) The solution states the elasticity of the marginal welfare gain (converted into dollars via E_u/E) with respect to the price of good m.
2. Some studies (for example, Anderson et al., 2006; Thompson et al., 2007) focus on real income measured in terms of food.
3. It is not necessary to specify how workers and landowners dispose of their income. The model assumes only that the absence of an equities market prevents non-capitalists from buying claims to the capital stock.
4. The saddle path is negatively sloped if

$$\sigma\delta < \frac{L_m\theta_T}{L_m\theta_T + L_x\theta_K}\left[\rho\tau\left(\alpha + \frac{\theta_{mL}}{\theta_K}\right) + \delta\left(\frac{\theta_{mL}}{\theta_K} + \alpha\frac{\rho + \delta\tau}{\rho + \delta}\right)\right].$$

For empirically relevant values, this condition is a close call. Regardless of whether it holds, the slope of the saddle path is fairly flat.

5. Since P_m and P_x are fixed when moving along the *WW* schedule, variations in ω mirror variations in w.
6. When the saddle path is positively sloped, the condition is slightly more stringent than in (2.43). ('Slightly' because the slope of the saddle path is fairly flat. See note 4.)
7. I have evaluated (2.43) at an initial free trade equilibrium and made use of the facts that $L_c/L_m = \alpha\delta\theta_K/(\rho + \delta)\theta_{mL}$ and $L_x/L_m = \theta_{xL}(1 - Y_m)/\theta_{mL} Y_m$, where $Y_m = Q_m/(Q_m + Q_x) = \gamma/[1 + \psi_m + \gamma\delta(1 - \alpha)\theta_K/(\rho + \delta)]$ and ψ_m is the ratio of imports to domestic production in sector m. (The expression for Y_m is derived from the condition for a zero trade balance.)
8. Banks are generally reluctant to lend for risky projects because they know that borrowers bear little of the downside loss when the project turns out badly. This creates an incentive for borrowers to invest in highly risky projects (Stiglitz and Weiss, 1981). In LDCs, the associated moral hazard and adverse selection problems are compounded by the inability of many borrowers to supply marketable collateral. As a result, credit rationing is common.
9. See Clerides et al. (1998), Aw et al. (2000), Mengistae and Pattillo (2004), Alvarez and Lopez (2005) and World Bank (2005).

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Table 2A.1 Studies that purport to find evidence of LBE

Study	Countries	Results
Mengiste and Pattillo (2004)	Ethiopia, Ghana and Kenya. Sample includes food and beverages	Cannot test directly for LBE. Results suggestive of LBE: 1. productivity premium is high for direct exporters (22%) but insignificant for firms that export through an intermediary 2. productivity premium is much higher for exporters who sell outside of Africa than for exporters who sell to Africa (42% vs. 22%)
Van Biesebroeck (2003)	9 countries in SSA, including Ethiopia, Kenya, Tanzania, Zambia and Zimbabwe, (country-specific coefficients, but only average estimates reported)	Variety of tests conducted. All support LBE. Productivity premium continues to grow while the firm exports. Productivity gain from LBE = 20–38%, with half of the gain attributable to greater exploitation of scale economies. (Non-exporters do not fully exploit scale economies because sales are limited by difficulties in financing trade credit and enforcing contracts)
Blalock and Gertler (2004)	Indonesia. Sample includes processed foods, ISIC 311 and 312	Productivity gain from LBE is small, only 2–5%. No evidence that the intensity of exporting (share of exports in total sales) or cumulative experience (years exporting) matter. One-time increase in productivity realized shortly after the firm commences exporting. LBE greatest for Food Processing ISIC 311 (6.8% gain), equals sample average for Food Processing ISIC 312 (4.9% gain)
Alvarez and Lopez (2005)	Chile	Claims to find evidence of LBE operating through 'conscious self-selection'. Test for conscious self-selection, however, is unconvincing. (Do firms invest prior to entering the export market? Yes, they do, but causation could run from higher productivity to investment and exporting)
Kraay (1999)	China. Agro-industry not in the sample. Firms are mainly state-owned enterprises	10% increase in the ratio of exports to output raises total factor productivity by 2%. Learning effects pronounced for established exporters, but insignificant for new entrants. Productivity gain ranges from 2% to 9%
Alvarez and Lopez (2006)	Chile	Strong evidence of productivity spillovers from exporters to local suppliers and to other firms in the industry
Clerides et al. (1998)	Mexico, Colombia and Morocco. Sample includes food processing	Generally mixed results, but evidence of intra-industry productivity spillovers in the food processing and leather industries in Morocco
Bigsten et al. (2004)	Cameroon, Ghana, Kenya and Zimbabwe. Sample includes food processing	In the preferred run, export participation increases productivity by 7%. Sign and significance of the results is sensitive, however, to the modelling of unobserved firm heterogeneity and the choice of estimator

3. Smallholder market participation: concepts and evidence from Eastern and Southern Africa*

Christopher B. Barrett[1]

1 INTRODUCTION

Why is smallholder market participation so important to economic growth and poverty reduction? The answer traces its origins at least to Adam Smith and David Ricardo: given a household's desire for a diverse consumption bundle, it can either undertake production of all such goods and services for autoconsumption, or it can specialize in production of those goods in which it is relatively skilled, consuming some portion and trading the surplus for other goods and services it desires but for which it holds no comparative advantage in production. The welfare gains that result from choosing market-oriented production and exchange emerge not just from the one-off, static welfare effects of trade according to comparative advantage, but perhaps even more from the opportunities that emerge from larger-scale production in the presence of nontrivial fixed or sunk costs of production (Romer, 1994) and from dynamic technological change effects associated with increased flow of ideas due to regular trade-based interactions (Romer, 1993), leading to more rapid total factor productivity growth (Edwards, 1998). Hence economists' appropriate preoccupation with trade and market-based exchange.

So why do so many smallholders in low-income rural areas opt out of markets? Surely this reflects something more than just widespread error. Instead, the problem is that market participation is a consequence as much as a cause of development. Just 'getting prices right' does not induce broad-based, welfare-enhancing market participation. Farm households must have access to productive technologies and adequate private and public goods in order to produce a marketable surplus. Yet

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investment in private assets, public goods and improved technologies requires that households earn enough that they can save and invest. Moreover, the institutional and physical infrastructure necessary to ensure broad-based, low-cost access to competitive, well-functioning markets likewise requires significant investment, typically by the public sector, paid for out of tax revenues or aid flows. One thus has to get institutions and endowments, as well as prices, 'right' in order to induce market-based development.

Those with access to adequate assets and infrastructure and faced with appropriate incentives engage actively in markets, while those who lack one or more of those three essential ingredients largely do not. Such multiple market participation equilibria commonly arise due to the fixed and sunk costs of investment, the coordination problems that arise in many cases of public goods provision, and the liquidity constraints that hamper households as well as governments at all scales in the low-income world (Barrett and Swallow, 2006). One low-level equilibrium – a poverty trap – is associated with semi-subsistence production by smallholders operating rudimentary production technologies with limited assets and participating modestly, if at all, in competitive and regionally or globally-integrated markets offering remunerative terms of trade. Other, higher-level equilibria associated with technological advance, increased commercialization and asset accumulation often exist simultaneously. The policy objective in rural development is to move households out of low-level equilibria and then to help them stay out permanently.

The transition from low productivity, semi-subsistence agriculture to high productivity, commercialized agriculture has been a core theme of development and agricultural economics for half a century or more. Timmer (1988) referred to this as the 'agricultural transformation', noting that processes of agricultural and rural transformation not only usher in increased productivity and commercialization in agriculture, they also involve economic diversification and accelerated economic growth so that agriculture's share of employment and output shrinks, even in rural areas. A key paradox is that increased smallholder market participation and total factor productivity growth must therefore go hand-in-hand with increased migration of smallholders out of agriculture. Of course, this implies that the commonplace sociopolitical objectives of (i) keeping everyone on the land, and (ii) stimulating agricultural transformation, may be mutually incompatible in the presence of fixed costs that create minimum efficient scales of operation in modern, market-oriented agriculture.

So what does it take to break out of the semi-subsistence poverty trap that appears to ensnare much of rural Africa? This chapter explores one small dimension of that problem, considering what it takes to ignite increased smallholder market participation, with a focus on staple foodgrains (such as cereals) in Eastern and Southern Africa. Unfortunately, the wave of market-oriented liberalization that overtook most of Sub-Saharan Africa has not fully delivered on its promises.[2] In some places, there seems to have been some level of retreat into subsistence (Jayne, 1994; Barrett, 1998; Reardon et al., 1999) in the wake of liberalization, even as other households have seized on emerging opportunities for more remunerative, market-oriented production, often coupled with technological progress and improvements in institutional and physical infrastructure (Kherallah, 2000; Minten et al., forthcoming). This bifurcated pattern is commonly found in systems characterized by multiple equilibria.

The tepid performance of staple foodgrains markets and smallholder producers in the wake of liberalization in Eastern and Southern Africa serves as a caution against placing undue confidence in trade and price policy as instruments for stimulating smallholder market participation and agricultural and rural transformation. Price-based, top-down interventions have to date proved insufficient to ignite such development. The evidence reported below suggests that interventions aimed at facilitating smallholder organization, at reducing the costs of intermarket commerce, and, perhaps especially, at improving poorer households' access to improved technologies and productive assets are central to stimulating smallholder market participation and escape from semi-subsistence poverty traps in the region.

The conceptual and limited available empirical evidence casts some doubt on attempts to facilitate national 'self-sufficiency' in staple food commodities or, more generally, to induce vigorous supply response or broad-based rural welfare gains through trade and price policy instruments alone. Such strategies assume (i) that national-level trade and price policy uniformly and robustly affects producer prices, which in turn affect smallholder production patterns, which clearly relies on assumptions of both spatial price transmission and smallholder market participation, and (ii) that smallholder welfare is improved by higher prices. While the desire for increased staple food crop production and greater (and lower cost) intra-African trade in staples is clearly warranted, the crucial question is how best to advance that goal. Is trade policy to adjust border parity prices for staple foodgrains really the appropriate policy response to the very real and serious problem of stagnant per capita food production, and to large and growing staple food imports from outside Africa into the region, some of it in the form of food aid? This chapter makes the case that trade policy and other top-down, price-based instruments may prove ineffective in promoting smallholder market participation and agricultural and rural transformation in the absence of ancillary interventions at micro- and meso-scale along the lines of more traditional agricultural development policy.[3]

2 CONCEPTUAL FOUNDATIONS

Market Participation Choice in a Non-separable Household Model

In order to frame the discussion that follows, let me briefly lay out a simple, stylized model of household market participation behaviour. The limited empirical literature on the subject, reviewed in the next section, implicitly or explicitly uses some variant of this model to explain observed agricultural marketing behaviours. The key features of the model are that market access is not uniform because households may face different transactions costs to market participation (Omamo, 1998a, b; Key et al., 2000; Renkow et al., 2004) and that geographic markets may likewise be differentially integrated into the global economy because of spatial differences in costs of commerce, in the degree of competition among marketing intermediaries, or both (Fackler and Goodwin, 2001). These two simple, realistic features rationally induce some households to self-select out of markets, attenuate the behavioural and welfare effects of price shocks, and result in structural patterns of market participation that have substantive implications for agricultural development policy and the use of other instruments, such as trade and exchange rate policy, for stimulating agricultural productivity growth and rural poverty reduction.

Assume a representative household maximizes its utility, defined over consumption of a vector of agricultural commodities, y^c for $c = 1, \ldots, C$, and a Hicksian composite of other tradables, x. It earns income from production, and possibly sale, of any or all of the C crops and from off-farm earnings, W, which could be earned or unearned. Each crop is produced using a crop-specific production technology, $f^c(A^c, G)$, that maps the flow of services provided by privately held quasi-fixed (and thus non-tradable) assets, for example, land, labour, livestock, machinery, reflected in the vector **A**, and public goods and services, such as roads, grades and standards, extension services represented by the vector **G**, into output. The farmer chooses whether or not to participate in crop markets as a seller, as represented by the vector $\mathbf{M}^{cs} = 1$ if the household enters the market to sell crop c, and zero if it elects not to sell the crop. Similarly, the household chooses the buyer-side market participation vector $\mathbf{M}^{cb}$, taking value one for every crop the household elects to buy and zero for all others.[4] The resulting net sales of a crop, $NS^c \equiv f^c(A^c, G) - y^c$, are nonzero if and only if either M^{cb} or M^{cs} equal one. The household faces a parametric market price for each crop, p^{cm} , and a vector of crop and household specific transactions costs per unit sold, $\tau^c(\mathbf{Z}, \mathbf{A}, \mathbf{G}, \mathbf{W}, \mathbf{NS}^c)$ that may depend on public goods and services, **G** (for example, radio broadcast of prices that affects search costs, extension service information on crop marketing strategies, road accessibility to market), household-specific characteristics (for example, educational attainment, gender, age) that might affect search costs, negotiating skills and so on, reflected in the vector **Z**, as well as the household's assets, **A**, liquidity from non-farm earnings, W, and net sales volumes. The latter might affect transactions costs when there is a fixed cost component such that per unit total transactions costs fall as volumes transacted increase. This could also capture nonlinear pricing wherein intermediaries offer different prices for output depending on the sales lot size.[5] The household's choice can thus be represented by the optimization problem:[6]

$$\underset{M^{cb}, M^{cs}, y^c, x, A^c}{\text{Max}} U(y^c, x),$$

subject to the cash budget constraint:

$$p^x x + \sum_{c=1}^{C} M^{cb} p^{c*} y^c = \sum_{c=1}^{C} M^{cs} p^{c*} f^c(A^c, G) + W,$$

the nontradables' availability constraints:

$$A = \sum_{c=1}^{C} A^c$$

$$(1 - M^{cb}) y^c \leq f^c(A^c, G) \forall c = 1, \ldots, C,$$

with each household-specific crop price determined by the household's net market position:

$$p^{c*} = p^{cm} + \tau^c(Z, A, G, W, NS^c), \text{ if } M^{cb} = 1$$

$$p^{c*} = p^{cm} - \tau^c(Z, A, G, W, NS^c), \text{ if } M^{cs} = 1$$

$$p^{c*} = p^a, \text{ if } M^{cb} = M^{cs} = 0$$

where p^a is the autarkic (such as nontradables) shadow price that exactly equates household demand and supply.[7] Because of the dichotomous nature of the market participation variables and the different prices associated with different market participation decisions, in order to solve this optimization problem, one must find the optimal $\{\mathbf{y}^c, \mathbf{X}, \mathbf{A}^c\}$ choices and the associated utility level conditional on each each feasible combination of

$\mathbf{M}^{cs}$ and $\mathbf{M}^{cb}$, then identify the market participation vectors $\{\mathbf{M}^{cb}, \mathbf{M}^{cs}\}$ that yield the maximum welfare (Key et al., 2000; Stephens and Barrett, 2006).

As is familiar from the nonseparable household modelling literature (de Janvry et al., 1991), the transactions costs to market participation create a kinked price schedule reflecting the price band defined by market prices plus and minus those costs, reflecting the net prices for buyers and sellers, respectively. The wedge created by transactions costs naturally leads some households to self-select out of the market for some goods that they both produce and consume, so that subsistence farmers whose allocation decisions are guided by shadow prices endogenous to the household co-exist alongside commercial producers whose decisions are guided by market prices endogenous to the local market. Moreover, the price band yields kinked demand and supply schedules that diminish price responsiveness because households cease to be price takers when they move into the autarkic region. Such nonconvexities are the basic building blocks of poverty trap models (Azariadis and Stachurski, 2005).

One last critical feature we need to consider is the potential geographic specificity of market prices for crops. A vast literature documents sizeable intermarket margins for agricultural commodities. Basic models of spatial equilibrium hold that the crop price, p^{cm}, in each local market, m, relates to the border price, p^{cb},[8] in a manner analogous to the relation between the household-specific price and the local market price:

$$p^{cm} = p^{cb} + t^c(G, Q), \text{ if } m \text{ is an importing market}$$

$$p^{cm} = p^{cb} - t^c(G, Q), \text{ if } m \text{ is an exporting market}$$

$$p^{cm} = p^{am}, \text{ if } m \text{ is autarkic}$$

where intermarket costs of commerce, $t^c(G,Q)$, are a function of the stock of public goods (for example, communication and transport infrastructure, property rights and so on) and the aggregate throughput in the local market, Q, and p^{am} is the local market price that equates local market demand (such as market demand across all households in m) with local market supply. This simply implies that the market price taken as given by individual households is endogenously determined within a price band for geographically specific markets.

These two distinct layers of transactions costs, one that is household specific and another that is crop and location specific, create two different, inter-related market participation questions. First, does the household participate in the local market? Second, does the local market participate in the broader, national or global market? These different costs create

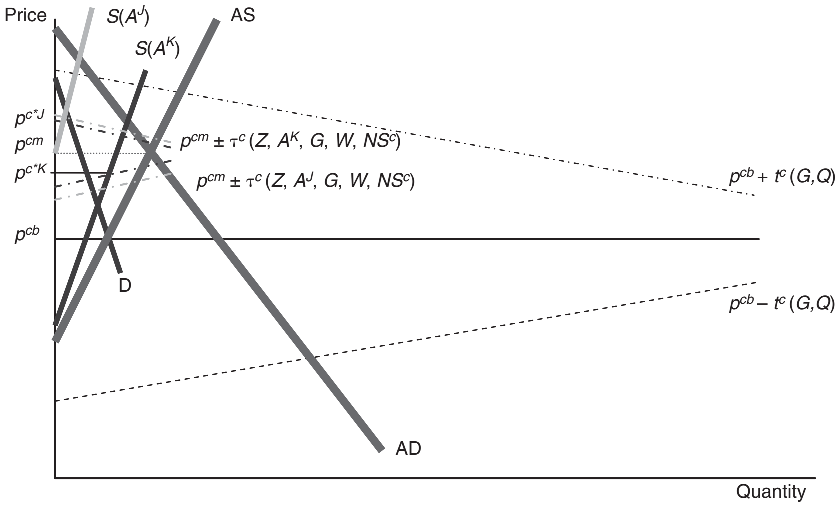

Figure 3.1 Market equilibria in a stylized remote, low-potential rural area

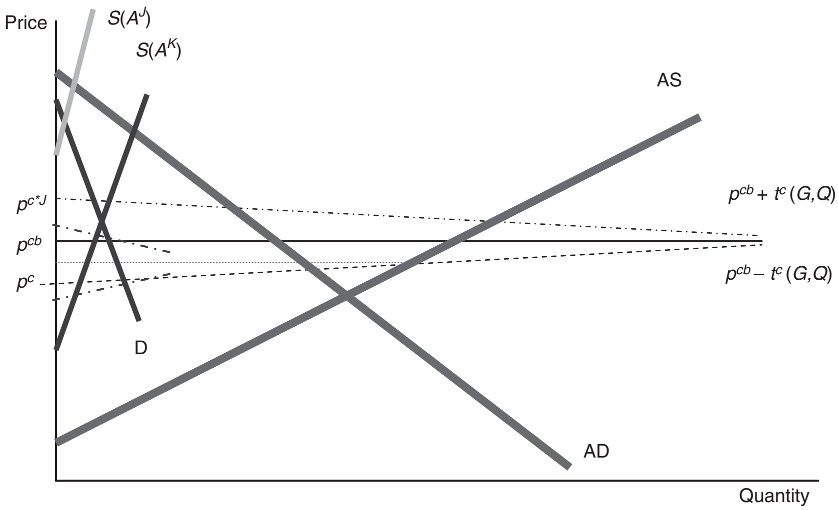

Figure 3.2 Market equilibria in a stylized accessible, high-potential rural area

buffers that trade and exchange rate policy must overcome in order to directly affect producer behaviour and welfare.

This double buffering effect is perhaps most easily understood graphically. Consider Figures 3.1 and 3.2, which depict different households operating in two different markets. Figure 3.1 represents a stylized low population density, low agricultural potential, more remote location with smaller aggregate demand and supply and larger costs of commercial integration with the border. Figure 3.2 represents a stylized higher population density, high agricultural potential area with better access to international markets. Each figure shows the same border parity price, p^{cb}, but with larger market level costs of commerce for location 1 than location 2, as reflected in wider price bands (the dashed black lines, marked $p^{cb} \pm t^{c}(G, Q)$, which slope towards p^{cb} due to the fixed cost component of transactions costs). The different structural conditions give rise to smaller and more inelastic aggregate demand (AD) and supply (AS) in more remote region 1, than in region 2.

The consequence is that region 1 is autarkic, with an active market that exchanges local produce within the community at a price above the border parity price. Meanwhile, by virtue of its better endowments, region 2 is a net exporting region with a local market-clearing price below the border parity price. Given the substantial costs of commerce and crop production in region 1, even fairly substantial changes to the border parity price, perhaps due to global market shocks, perhaps to trade policy reforms or exchange rate adjustment, will not affect local market equilibrium in the segmented market. By contrast, any upward border price adjustment will raise prices, supply and exports from region 2, given its integration into the broader economy. This simple stylized model can thereby account for spatial dispersion of prices, heterogeneous supply response to exogenous price shocks, and incomplete spatial price transmission.[9]

Now let us consider household level variation within a local market. Each figure depicts the same two households. For simplicity's sake, assume they have exactly the same demand schedule (D) for the staple crop. But because household J is less well-endowed with productive assets than household K, their supply curves differ ($S(A^{J}) < S(A^{K})$ at any price level), perhaps because K has more land and livestock to devote to production. Likewise, household specific transactions costs differ, perhaps because K's superior endowments afford lower cost access to finance. The result is that in the autarkic, remote market 1, K is a net seller and J is a net buyer. Although both households produce the staple crop, K's greater asset endowment leads to greater output and thus a higher probability of market participation as a seller and a higher sales volume conditional on market participation.

Structural differences between households also lead to cross-sectional variation in unit prices, even without allowing for any differences in product quality or timing of transactions.[10] Of greatest interest for policy analysis purposes, neither household's behaviour or welfare would be affected by most reasonable upward adjustments in the border parity price because of the market's isolation, as discussed already. Only micro- or meso-level interventions that shift household-level productivity or demand or local market-level transactions costs will generate behavioural or welfare effects.

By contrast, in market 2, lower prices drive household *J* out of production of the staple crop altogether, although because it is a net buyer in either market, *J*'s welfare is higher in market 2 thanks to the lower prices. Household *K* – a net seller in autarkic market 1 – becomes, just barely, a net buyer in net exporting market 2. But because the upper bound of *K*'s price band falls just below its autarkic equilibrium, although any upward adjustment in the border parity price will induce a corresponding increase in local prices because the market is integrated into the broader global economy, there is a sharp limit on household *K*'s supply or welfare response to higher market prices, as these are likely to knock it out of the market into an autarkic position. Household *J*, however, will remain a net buyer even in the face of more substantial price increases in market 2. Thus supply response and welfare effects to exogenous changes in border parity prices can vary considerably among households due to structural differences among them.

Combining these two layers of costs, it becomes apparent that structural factors associated both with the costs and competitiveness of market access and intermediation, and with the productive endowments of individual households, affect market participation and the supply response to and welfare effects of exogenous border parity price changes. The costs of commerce may dominate in some places, private asset holdings in another. But both of these structural features are central to explaining patterns of market participation and thus the ease with which policymakers can use price policy to achieve either staple foodgrains supply or rural welfare objectives.

Another way to see this effect is to consider the instantaneous welfare elasticity with respect to any exogenous change in a crop's border parity price, p^{cb}, referred to by Deaton (1997) as the 'net benefit ratio'. The net benefit ratio,

$$\beta \equiv \frac{p^{c*}NS^{c}}{w + \sum_{c=1}^{c} p^{c*}f^{c}} \cdot \frac{\partial p^{c*}}{\partial p^{cm}} \cdot \frac{\partial p^{cm}}{\partial p^{cb}},$$

is the budget share of the net sales of commodity *c* times the marginal effect of the change in market price on the household's shadow price times the marginal effect of the change in the border parity price on the local market price. In Deaton's standard formulation, assuming scalar prices uniformly faced by all households (such as without household- or market-specific price bands), the two partial derivatives each equal one. Thus, for net seller households in markets competitively integrated into the global economy,

$$\beta^* \equiv \frac{p^{c*}NS^c}{w + \sum_{c=1}^{c} p^{c*} f^c}$$

is positive and equal to the income share represented by crop net sales, while for net buyers in markets competitively integrated into the global economy, β^* is negative and equal to the budget share of net crop purchases. However, once one allows for the possibility of nontrivial transactions costs of household market participation and similarly nontrivial costs of intermarket commerce, these effects can be easily attenuated. In the limit, for autarkic households operating within the price band created by transactions costs, and for a household participating in any local market that operates within the geographic price band created by costs of intermarket commerce, the instantaneous welfare effect of border price changes is zero.

Of course, the net benefit ratio is a very short-run measure of welfare effects. It does not allow for partial equilibrium adjustment of consumption or production behaviours, much less for general equilibrium effects associated with induced changes in labour and other markets. Yet the core qualitative point remains: frictions that reduce household participation in local markets, local markets' integration with the broader, global economy, or both, attenuate the welfare effects of price changes induced by government use of policy instruments or by other exogenous shocks.

This principle carries over from welfare effects to behavioural response, as well. Autarkic behaviour associated with selective market failures 'severely constrain peasants' abilities to respond to price incentives and other external shocks' (de Janvry et al., 1991, p. 1401). Going one step further, Dyer et al. (2006) show how factor market linkages substantially complicate aggregate supply response as changes in market prices can indirectly alter even the shadow prices in subsistence households via general equilibrium effects in land and labour markets. The resulting aggregate supply effect is analytically ambiguous, depending fundamentally on the nature of the other markets. If, for example, increased staple crop production on commercial farms in response to increased prices bids away labour and land from subsistence households, the induced supply contraction among the latter subpopulation can reduce, even reverse the aggregate supply response of commercial farmers.

This simple nonseparable model with double buffering due to household- and market-level transactions costs thus allows the market participation and welfare effects of price and trade policy changes to vary by crop, household and location. As the next sub-section demonstrates, it also helps to underscore the important linkages between markets and technologies. These features are useful in the next section's framing of the extant empirical evidence on smallholder market participation, as well as the policy implications of that evidence.

Markets and Technologies

The relationship between markets and technologies is complex. For present purposes, three key points merit brief attention. First, from the household's perspective, a market is analytically equivalent to a production technology. This implies that market participation choices can be studied similarly to technology adoption choices. Second, a household's production technology fundamentally affects its market participation choice by affecting its productivity. Households operating rudimentary agricultural productivity technologies may participate in markets, but often only because they must use commodity markets as a way to resolve pent up demand for financial services to which they have no access. Thus promoting technological advance is essential to inducing broader-based market participation and aggregate supply response to price-based policy instruments. Third, and underscoring the close interdependence between markets and technologies, the returns to adoption of improved production technologies is fundamentally influenced by the nature of the market. Individual producers always have an incentive to adopt a cost-reducing technology. But the gains from adoption depend fundamentally on aggregate supply response and induced price changes. Because well-integrated markets transmit excess supply to distant locations, the returns to increased output diminish less quickly there than they do in segmented or poorly integrated markets and the potential for adverse welfare effects on non-adopters is likewise lower.

Consider the first point. From the household's perspective, a market is analytically equivalent to a production technology. Consider a crop c' that the household wishes to consume. There are multiple ways to 'produce' c'. The most obvious is direct production, $f^{c'}(A^c, G)$. But there are also at least $C - 1$ alternative means attainable through the production and subsequent market sale of another crop with the sales proceeds used to purchase c'. This latter 'technology' is represented by $\frac{p^{c*}}{p^{c*'}} f^c(A^c, G) \forall c \neq c'$, and has all the usual (quasi-concave, monotone and so on) properties of a standard production technology. The choice of means by which to obtain c' boils down to standard Ricardian analysis of comparative advantage and choice to produce according to comparative advantage, given the complex shadow price schedule identified above. That choice is no different than the choice among alternative means of directly producing *c*, such as, market participation decisions are analytically analogous to technology adoption decisions. Social scientists can study the two phenomena similarly but, as shown in the next section, empirical research on market participation behaviour has been extremely thin, especially as compared to technology adoption studies, perhaps especially with respect to staple food commodities.

It bears brief mention that in both the technology adoption and market participation cases, fixed costs and risk play an important role. As Romer (1994) explains in discussing trade policy, in the presence of fixed costs, production scale matters to whether or not it is optimal to produce or consume a good at all. When one allows for goods to appear or disappear from a household's optimal portfolio based on achieving a critical market mass, the efficiency losses associated with trade frictions due to transactions costs can become quite large.[11]

The second core point of this sub-section is that technologies directly affect market participation because the productivity of a household's asset stock heavily influences its net marketable surplus position. In Figures 3.1 and 3.2, we illustrated the differences in market participation patterns that arise among households due to variation in endowments of productive assets. Differences in production technologies generate precisely the same effect. The differences between stylized households *J* and *K* in those figures could be generated by *K*'s use of superior technologies, with identical productive asset endowments between the two households, as much as by endowment differences given the same technology in use. Those using highly productive modern technologies are far more likely to produce more than they choose to consume than are those who use the same input bundle but with more rudimentary production technologies. Improved production technologies thus provide a more reliable driver of increased supply than do exogenous price shocks due to policy change.

Third, markets also influence technology adoption patterns by affecting the returns to increased output. In the unrealistic, limiting case where a household has no market access, incentives to adopt improved technologies are limited because the household specific shadow price falls quickly as its own demand for the crop becomes satiated. In the opposite limiting case of a household facing infinitely elastic demand for its marketable surplus, returns to additional output are not diminishing due to (shadow) price effects. The issue here relates less to household specific transactions costs and market participation status than to local market conditions. In better integrated markets, returns to increased output diminish less rapidly than in locally segmented markets characterized by more price inelastic demand (Gabre-Madhin et al., 2002).

This merely reflects the classic 'technology treadmill' effect (Cochrane, 1958). The idea is simple but powerful. In a small open economy in which producers face infinitely elastic demand, the social gains from any technological change accrue entirely to producers in the form of higher profits. By contrast, if demand is perfectly inelastic, all the social gains accrue to consumers in the form of lower prices. The distribution of the gains from technical change therefore depends crucially on the price elasticity of demand for the product, which in turn depends heavily on how well integrated the local market is with broader national, regional and global markets. Since most agricultural products exhibit highly inelastic demand, if only because of physiological limits to food consumption, maintaining efficient market integration is that much more important in order to ensure producers benefit in the long run from technological change. Producers adopt new technologies because they reduce unit costs, thereby increasing productivity and output. But in general equilibrium, when enough producers adopt the cost-reducing technology that the aggregate supply curve shifts and prices fall too, it potentially leaves producers worse off than before if demand is sufficiently inelastic. This reveals an important fallacy of composition: what is welfare-enhancing and optimal in the small may prove welfare-reducing in the large. For this reason, the state of agricultural markets, which determine the price elasticity of demand faced by producers, and the dynamics of adoption are central to understanding the distributional effects of technology adoption. Early adopters benefit, at least temporarily, while late adopters and non-adopters never benefit or even suffer welfare losses due to diffusion of improved technologies. Better integration of local markets into broader global markets limits the losses suffered by smallholders too poor to afford new technologies, increases the gains enjoyed by those farmers who do adopt improved production technologies, and increases the incentives to invest in adoption of new technologies.

Empirical Evidence on Smallholder Market Participation in Eastern and Southern Africa

With this conceptual background in place, we now review the empirical evidence on smallholder market participation in Eastern and Southern Africa. There are quite a few papers that touch on market participation issues with respect to higher value cash crops, livestock or animal products, such as fruits and vegetables in Kenya (Dolan and Humphrey, 2000; Kherrelah, 2000; Humphrey et al., 2004; Minot and Ngigi, 2004), coffee in Uganda (Fafchamps and Hill, 2005), livestock in Ethiopia, Kenya or both (McPeak, 2004; Barrett et al., 2006; Bellemare and Barrett, 2006), milk in Ethiopia (Holloway et al., 2000, 2005), cotton in Mozambique, Tanzania, Uganda, Zambia and Zimbabwe (Poulton et al., 2004), and cotton and tobacco in Mozambique (Boughton et al., 2006). There is also a small, emerging literature on smallholder participation in new contract farming and modern marketing channels associated with supermarkets and other large-scale downstream distributors (Kirsten and Sartorius, 2002; Reardon et al., 2003; Weatherspoon and Reardon, 2003; Neven et al., 2006; Minten et al., forthcoming). But those studies are likewise predominantly about high-value commodities, especially horticultural crops. Two seminal papers on smallholder market participation focus on staple foodgrains, but in other regions: coarse grains in Senegal (Goetz, 1992) and maize in Mexico (Key et al., 2000).

The body of empirical evidence concerning smallholder staple foodgrains market participation patterns in Eastern and Southern Africa is thin but consistent and clear with respect to some basic descriptive patterns. First, a relatively small share of rural households or crop producers, the appropriate population varies by study, sell staple foodgrains. This holds with respect to gross sales, but especially in net terms, that is, sales less purchases. Second, there are strong associations between households' asset holdings, especially of land, and geographic factors such as market access and agroecological zone and household-level market participation patterns. Wealthier households and those cultivating in higher potential agroecological zones appear much more likely to sell to market than are other households. Third, transactions costs associated with weak institutional and physical infrastructure are substantial and appear to distort production and marketing behaviours significantly, muting the effects of price policy and causing significant social inefficiency. These three core themes, that many farmers are not net staple crop sellers, that net sales are positively associated with asset endowments and favourable geography, and that transactions costs exert considerable influence on crop marketing patterns – follow directly from the previous section's model. The sub-sections that follow elaborate on the empirical evidence for these three points.

3 CROSS-SECTIONAL EVIDENCE ON SMALLHOLDER MARKET PARTICIPATION PATTERNS

The population of Eastern and Southern Africa remains disproportionately rural, with the overwhelming majority of residents growing staple foodgrains. But most such production continues to be for autoconsumption, that is, semi-subsistence rather than commercial production. A relatively small share of households sell foodgrains and for many of those who do sell, the quantity sold is often small and dwarfed by gross purchases at other times of the year. For example, Stephens and Barrett (2006), studying smallholders in western Kenya, find that of the nearly 30 per cent of the sample that were net maize sellers in the harvest period, 62 per cent were net maize buyers a few months later.[12] Renkow et al. (2004) similarly find that about 10 per cent of their sample of western Kenyan maize farmers both bought and sold maize, and that 83 per cent of maize sales occurred within two months of harvest, when prices reach seasonal lows, with purchases generally occurring far later in the season, after households' stored maize had run out and when prices typically reach their intra-annual highs.

The available empirical evidence varies considerably in several dimensions. The type of household survey sample collected ranges from nationally representative of all households or of rural households, to purposive samples. Some authors report net sales, while others report gross sales. Most of the studies offer crop specific estimates, but in some cases they report commodity aggregates (for example, 'basic foods', 'cereals'). Thus the direct comparability across the published studies of smallholder participation in staple foodgrains markets in Eastern and Southern Africa is somewhat limited by methodological differences. That caveat aside, very consistent patterns emerge that merit attention.

As Table 3.1 shows, across multiple countries, crops and years, sellers consistently represent a minority of farmers or rural households (depending on the survey definition). Less than one-quarter of rural households in the Ethiopia sample had gross sales of any of the five cereals covered by Levinsohn and McMillan (2005); similarly, less than one-quarter of Rwandan households were net sellers of beans or sorghum (Weber et al., 1988). The highest estimates, of 45 per cent net maize sellers in Zimbabwe in 1984–85 and 39 per cent net sellers of maize in Somalia in 1986–87, are now quite dated figures from countries that have experienced serious crises in the meantime that have almost certainly driven those figures down dramatically. While the coverage and comparability of the studies cited in Table 3.1 are limited, the pattern is nonetheless quite clear. Relatively few rural farm households are actively engaged in staple foodgrains markets as sellers. Moreover, because of the double buffering effect explained in the preceding section, these survey figures on local market participation necessarily overestimate the share of farmers who participate in national or global markets.

While few households are net, or even gross, sellers of foodgrains into the

Table 3.1 Staple foodgrains market participation in Eastern and Southern Africa

Country	Crop	Year	% Sellers (g = gross, n = net)	Study
Ethiopia	Maize and teff	1996	25 n	Jayne et al. (2006)
	Barley	1999–2000	10 g	Levinsohn and McMillan (2005)
	Maize	1999–2000	23 g	(rural households only)
	Sorghum	1999–2000	11 g	Levinsohn and McMillan (2005)
	Teff	1999–2000	20 g	Levinsohn and McMillan (2005)
	Wheat	1999–2000	12 g	Levinsohn and McMillan (2005)
Kenya	Maize	1997	29 n	Nyoro et al. (1999)
		1998	34 n	Nyoro et al. (1999)
		1999	39 n	Renkow et al. (2004)
		2000	30 n	Jayne et al. (2006)
Madagascar	Rice	1990	32 g	Barrett and Dorosh (1996)
		2001	25 n	Minten and Barrett (2006)
Mozam-bique	Basic food	1996–97	14 g	Heltberg and Tarp (2002)
	Maize	2001–02	30 g	Boughton et al. (2006)
	Maize	2005	16 g	Tschirley and Abdula (2007)
	Rice	2002	43 n	Tschirley and Abdula (2007)
Rwanda	Beans	1986–87	22 n	Weber et al. (1988)
	Sorghum	1986–87	24 n	Weber et al. (1988)
Somalia	Maize	1986–87	39 n	Weber et al. (1988)
Tanzania	Food	2003	33 n	Sarris et al. (2006)
Zambia	Maize	2000	26 n	Jayne et al. (2006)
Zimbabwe	Maize	1984–85	45 n	Weber et al. (1988)
	Grains	1996	27 g	Govereh and Jayne (2003)

market, this does not imply widespread self-sufficiency in foodgrains among smallholder households. Indeed, true autarky is rare. Cadot et al. (2006) estimate that only 7.5 per cent of Madagascar's farms were autarkic in 2001, down a bit from what Barrett and Dorosh (1996) found a decade earlier.

Rather, a large share of smallholders are net buyers of the food crops they produce, relying on proceeds from cash crops and off-farm employment to generate the earnings needed to supplement their own food crop production with market purchases. Of course, this means that most small farmers in the region are hurt, not helped, by policies that increase local prices for staple foodgrains. Weber et al. (1988) made this core point nearly twenty years ago, finding that in major grain producing regions of five countries for which data were available in the mid-1980s, 50 per cent or less of smallholder producers were net sellers of staple grains they grew. Indeed, in several places they found net buyers were an outright majority. For example, 61 per cent of rural households in Somalia were net maize buyers, 67 and 73 per cent of rural households in Rwanda were net buyers of sorghum and beans, respectively. Still, policymakers and many development researchers continue to discuss development policy for rural Africa as if all farmers were net sellers of the crops they produce and thus stood to benefit from increased prices. The evidence against that popular belief is now overwhelming.

Moreover, it is not just that few households sell foodgrains into the market. There is also a tremendous concentration of sales among a relatively small share of those producers who do sell. For example, in their study of rice producers in Madagascar, Barrett and Dorosh (1996) found a Gini coefficient of gross rice sales of 0.829 as just 5 per cent (16 per cent) of rice farmers accounted for 50 per cent (80 per cent) of rice sales. Similarly, Nyoro et al. (1999) find that roughly 10 per cent of the farmers accounted for about 75 per cent of all the maize sold by Kenyan smallholders in both 1997 and 1998, while Boughton et al. (2006) found that only 6 per cent of maize growers in Mozambique account for 70 per cent of total quantity sold. Jayne et al. (2006, p. 334) summarize findings from five different surveys concerning maize in the region and conclude that 'a small group of relatively large and capitalized smallholder farmers . . . (usually 1–3 percent of the total farm population), located in favorable agro-ecological areas, [account] for 50 percent of the marketed maize produced by the smallholder sector'. Clearly, staple grain sales are extremely concentrated in the hands of a relatively few producers. As the evidence discussed in the next subsection demonstrates, these are also the wealthiest farmers.

Patterns by Private Asset Holdings and Geography

The patterns described above do not appear uniform across all smallholders. Rather they seem closely related to households' endowments of productive assets and production technologies, as well as their geographic location. The standard pattern for gross sales, purchases and autarky is

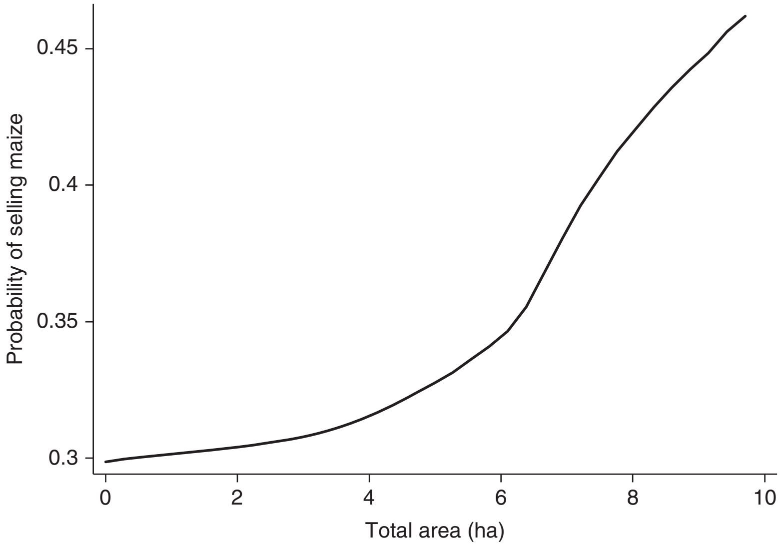

Figure 3.3 Maize market participation patterns by landholdings, Mozambique, 2001–2002

depicted in Barrett and Dorosh (1996), who describe three nonparametric regressions reflecting the estimated probability of a household being in each of those three regimes. Farm households with the least land (and other productive agricultural assets) are almost always gross purchasers in the market, but the probability of making gross purchases declines steadily as a household's land holdings increase.

Conversely, the likelihood that a farm household registers any gross sales is very low – less than 20 per cent – over the first third of the land distribution but rises steadily, such that the best endowed quartile of farmers exhibit a probability greater than 50 per cent of selling to market. In the 1990 Malagasy farm household data, households with median land holdings had equal probability (about 40 per cent) of making gross purchases and gross sales. Perhaps least intuitive for many observers, the probability of a household being autarkic increases steadily with land holdings up to the median, after which it is essentially constant. Autarky is not the domain of the poorest, but rather an option only for those with adequate resources to disengage from the market when transactions costs and the risk associated with commercial exchange prove too great.

Figure 3.3 shows a very similar pattern of maize sales among rural households in Mozambique in 2001–02.[13] The probability of selling is low and generally flat over most of the land distribution, then climbs steeply for the upper 10 per cent or so of the land distribution, those with four or more hectares. Again, the positive association between land holdings and gross market participation as a seller is striking and clear. Indeed, these patterns appear repeatedly in the few studies from the region that study smallholder market participation (Nyoro et al., 1999; Heltberg and Tarp, 2002; Cadot et al., 2006).

The gross sales patterns are likely to understate the relation between household wealth and marketing patterns given that a certain amount of gross sales by poorer smallholders merely reflect displaced financial market distortions as farmers will use commodity markets to sell, then later buy back a commodity (or commodities) seasonally as a form of de facto seasonal credit when they are rationed out of lending markets (Stephens and Barrett, 2006; Barrett, 2007). The evidence from Eastern and Southern Africa on the relation between net foodgrain sales and household assets or income is strong and widespread. Levinsohn and McMillan (2005) find that net sellers of wheat are far richer than net buyers, that net benefit ratios are higher for poorer households, indicating that poorer households benefit proportionately more from a drop in the price of wheat than richer households do. They likewise find that the proportion of net sellers is increasing in living standards, reflecting geographic concentration of net sellers in higher potential regions with better marketing infrastructure. Nyoro et al. (1999) find very similar patterns in Kenya, where the only region in the country in which over half of the surveyed households were net maize sellers was the high potential zone for maize cultivation, which was also relatively more affluent. They too find a strong relationship between household well-being and net maize sales. Jayne et al. (2001) and Minten and Barrett (2006) likewise find far higher rates of net seller households and sales volumes conditional on market participation in higher potential areas of Kenya and Madagascar, respectively.

Barrett and Dorosh (1996) demonstrate that for farm households in Madagascar, not only are net rice sales strongly increasing in land holdings, but that marketable surplus increases even more steeply.[14] Households with median land holdings were roughly at zero net sales, while the lowest quartile of the land or income distribution had net benefit ratios below −0.2, indicating significant vulnerability to staple foodgrains price increases, while the wealthiest 10 per cent or so of farmers would stand to gain, with net benefit ratios above 0.2. Note that this 'food price dilemma', wherein higher prices that induce added output from net sellers comes at a (short-term) cost in terms of the welfare of poorer households (Timmer et al., 1983), generally does not apply to higher-value commodities such as livestock, export crops and non-food agricultural commodities, for which net purchases by rural households appear relatively rare.[15]

Private asset holdings can also play a valuable, indirect role in facilitating access to credit necessary to undertake productive investment. A large literature has established the empirical regularity that credit and insurance access is strongly and positively related to borrowers' wealth (Besley, 1995). Multiple studies find that households with access to credit transact more in foodgrains markets (Cadot et al., 2006; Stephens and Barrett, 2006). While the pathways through which this effect emerges are not yet entirely clear, it seems likely that part of this effect emerges because liquidity permits households to invest in higher yielding, longer cycle crops, in seasonal inputs that boost yields, and in improved production technologies that require some initial sunk costs. Findings of apparent complementarities between cash crop and food crop production, such as higher use of purchased fertilizers and greater food crop yields among cash crop producers, could well arise in part due to credit commonly provided under cash cropping contracts (Govereh and Jayne, 2003). There thus appear multiple pathways through which private wealth affects market participation.

Since market participation is directly related to generating a marketable surplus, which in turn depends on productivity, wealth is likely to have an important impact through its influence on technology adoption patterns. Indeed, in their study of market participation in Mozambique, Heltberg and Tarp (2002) find that maize yields have the greatest marginal impact on market participation, for both poor and non-poor households, with more than twice as great an impact as the next most important factor (access to transport). While the obvious endogeneity of yields, technology choice and market participation choices makes inference in this area a bit troublesome, the intuition is clear, even if the empirical evidence is thin and statistically contestable: improved technologies are associated with increased market participation.

The Market Participation Impacts of Policy and Project Interventions

> [T]he costs of transacting are the key to the performance of economies. There have always been gains from trade . . . but so too have there been obstacles to realizing these gains . . . The costs of transacting . . . are the key obstacles that prevent economies and societies from realizing well-being. (North, 1989, pp. 1319–20)

In order to study directly the impact of different policy or project interventions on smallholder market participation, one would need longitudinal data on smallholders and the means, through randomization of interventions or availability of suitable instruments to control for placement and selection effects in non-random interventions, to identify induced behavioural changes. The lack of direct study of the impact of interventions on smallholder market participation sharply limits the empirical evidence base on which to make inferences as to what effect different policies have on market participation behaviour. The available evidence offers necessarily murkier, indirect evidence as to what sorts of interventions are most likely to stimulate increased market participation. The key themes that stand out in the literature are that the key interventions to induce increased smallholder market participation are aimed at reducing the costs of households' access to local markets, of integrating local and international markets, and of organizing farmers, as well as policies to stimulate increased trader competition.

The primary theme in the literature on smallholder market participation is the importance of transactions costs. Coase (1937) famously observed that transactions costs are the basis for the organization of all economic activity and can explain much of the behaviour of households and firms. Following Key et al. (2000), household crop supply and welfare response to exogenous market price changes are heavily affected by transactions costs, which create important discontinuities in supply response and non-convexities commonly associated with poverty traps. The transactions costs that have attracted most attention by analysts are those associated with transport. Thus Heltberg and Tarp (2002) and Boughton et al. (2006) both found that household ownership of means of transport (bicycle or motorized vehicle) increases foodgrains market participation and sales volumes conditional on participation. Jayne (1994) and Omamo (1998a,b) both found that high marketing costs for low value-to-weight staple foodgrains drive smallholders to grow importable staples, substituting for cash crops offering higher returns if the costs of commerce were less significant. Overall, Omamo (1998a) reports that smallholders in western Kenya could raise farm profits by at least one-third if the significant transactions costs to crop market participation did not induce greater cultivation of maize and sorghum (and less of cotton) than straight comparative advantage in production would predict. He shows how the seemingly inefficient prominence of low-return food crops among western Kenyan smallholders reflects a rational food import substitution response by households to high transport costs in product markets.

Renkow et al. (2004), also studying Kenyan smallholder households, find that fixed transactions costs, on average, act like a 15 per cent ad valorem tax on crop sales, slightly lower in areas with reliable motorized transport service and that are closer to markets. Because fixed transactions costs thus appear 'a significant, but not insurmountable, barrier to market participation' (p. 361), they argue for public infrastructure investments as a means to increase the net returns to agricultural production by lowering transactions costs and by improving the timely availability of inputs such as fertilizers, thereby increasing productivity and marketable surpluses. Moreover, the gains from such public infrastructure investments would accrue disproportionately to relatively remote rural households, who appear worse off by most welfare measures.[16]

Taking a very different approach, Cadot et al. (2006) attempt to estimate the costs of entry into agricultural markets for pure subsistence producers in Madagascar. They estimate massive costs to entering markets of 124 to 153 per cent of subsistence farmers' annual production. Their findings point to remoteness as a substantial barrier to entry into commercial farming, along with credit constraints, crop price risk, and insufficient asset holdings (especially land and education). They also find that subsistence farmers' average agricultural profits are 30 per cent lower than those for farmers who sell to market, a figure strikingly similar to Omamo's (1998a) from western Kenyan maize systems.

The problem is not simply household-level transactions costs. As reflected in the conceptual model laid out in the previous section, the market-level costs of reaching international markets also play an important role by segmenting spatially distinct markets and thereby dampening both competition and price transmission. Moser et al. (2006) report that directly measurable transport costs to the *nearest* major city average 12–18 per cent of rice prices in rural Madagascar and that the costs of interregional commerce within that country are sufficiently great that more than 80 per cent of the nation's nearly 1400 communes are economically separated from the nation's main market in Antananarivo. Mabaya (2003) similarly reports very high marketing margins for spatial arbitrageurs operating in maize markets in Zimbabwe.

Fiscal retrenchment by governments has cut sharply into roads maintenance, police protection and provision of other essential public goods and services in much of Eastern and Southern Africa. Poor access to such goods and services promotes isolation that negatively affects uptake of improved production technologies, market participation, exports and food security (Stifel et al., 2003; Minten and Barrett, 2006).[17] Coupled with exchange rate devaluation or depreciation that drives up the cost of tradable inputs (for example, fuel), many market-oriented reforms of the past twenty or so years have sharply increased the costs of commerce, driving some regions and households back towards subsistence production (Jayne, 1994; Barrett, 1995, 1998, 1999; Reardon et al., 1999). These effects have not been uniform and in many places have been outweighed by the added vigour of newfound competition in markets in which private intermediaries had long been banned from competing against parastatal marketing boards, as well as by rapid progress in information and communications technologies such as mobile telephony. The spatially diverse impacts of liberalization on market performance and participation in much of rural Sub-Saharan Africa are likely to owe much to the countervailing effects of this twinning of deregulated competition with degraded institutional and physical infrastructure, which has been labelled the 'market relaxation–state compression hypothesis' (Barrett, 1995).

One often overlooked effect of weak marketing infrastructure, both institutional (for example, contract law, police protection, uniform grades and standards) and physical (for example, roads, electricity), is that it leads to considerable spot market price risk (Fafchamps, 2004). Price risk is another important impediment to market entry (Heltberg and Tarp, 2002; Cadot et al., 2006), as well as to adoption of improved agricultural technologies and investment in productive assets, thereby compounding the market participation effects. Indeed, reducing price risk is a prime reason many farmers in Madagascar cite for signing on with contract farming schemes (Minten et al., forthcoming). As government control over agricultural pricing tended to reduce both the mean and variance of producer prices in the pre-liberalization era (Krueger et al., 1988), market-oriented reforms have generally led to greater price volatility, which in some cases appears to have fuelled a retreat towards subsistence by some producers and increased isolation of some markets, such as more remote areas that previously benefited from pan-territorial pricing policies (Jayne, 1994; Barrett, 1995, 1998, 1999; Minot, 1998; Reardon et al., 1999).

Competition among traders is related to, but distinct from, issues of spatial price transmission, price risk and the costs of arbitrage. When markets are spatially segmented and marketing costs are substantial and involve a significant fixed or sunk cost component, the minimum efficient scale of arbitrage may create natural oligopsony or monopsony. Thus, Bernier and Dorosh (1993) found that only 29 per cent of rice farmers in Madagascar had access to more than one crop buyer and outside the central highlands, home to the nation's best infrastructure, that figure fell to only 6 per cent. Barrett (1997) similarly finds that in spite of massive entry into low-entry cost niches of food marketing channels post-liberalization in Madagascar, high entry costs into wholesaling, interregional transport and interseasonal crop storage sharply limit competition and boost intermediary profits in those functions. Further reinforcing the impression that imperfect competition may be an issue in at least some settings, Moser et al. (2006) find evidence consistent with excess marginal profits to rice arbitrage at regional scale in Madagascar. Osborne (2005) likewise finds that imperfect competition among traders in grain markets in Ethiopia inflates their profits and drives down prices paid to farmers. If imperfect competition in rural markets is widespread, a hypothesis subjected to surprisingly little empirical testing in rural Africa (Osborne is a notable exception), then competition policy may be an important tool of government to improve price transmission and the appeal of market participation for smallholders.

One response to imperfect competition in the marketing channel is to organize farmers so as to gain bargaining power so as to extract better terms of trade from downstream purchasers. There has thus been considerable resurgence of interest in farmer cooperatives, direct marketing by growers, and other commercial ventures aimed at increasing seller-side bargaining power in agrifood markets (Kirsten and Sartorius, 2002). Farmer organizations can facilitate vertical and horizontal coordination that can otherwise lead to low-level equilibria in the presence of product- or contract-specific assets (Williamson, 1985). Because asset specificity leaves investors vulnerable to contract hold-up problems, there are significant prospective gains to avoiding spot markets by instead undertaking contracts that provide assurances against hold-up, most commonly through interlinkage of forward sales contracts with input supply, credit, provision of extension services, and so on, and that enable producers to coordinate on quality control and product assembly so as to reduce the average fixed costs intermediaries face in collecting commodities (Kirsten and Sartorius, 2002). Various forms of cooperatives and contract farming schemes are the most common such mechanisms. In at least some settings, well-managed farmer groups have indeed proved reasonably successful in generating better terms of trade for producer members, although most such evidence comes from cash crops, especially dairy and horticulture (for example, Minot and Ngigi, 2004; Poulton et al., 2004; Nyoro and Ngugi, 2007). To date, there has been relatively little documented success with foodgrain farmer organizations in Eastern and Southern Africa. Moreover, Cadot et al. (2006) find that producer associations in Madagascar increase the return to commercial farming but do not facilitate entry into commercial farming for subsistence producers. This conforms with findings in the contract farming and supermarkets literatures that farmer level organizations intended to facilitate access to higher-return marketing channels appear to be serving largely established farmers already generating surpluses and selling to market (Reardon et al., 2003). So the smallholder market entry impact of farmer organizations remains unclear.

The Complex Impact of Food Aid on Smallholder Market Participation

As Eastern and Southern Africa has become the primary destination for global food aid over the past two decades, increasing questions have emerged about its impact on markets and local agricultural producers. There is no direct evidence of the smallholder market participation effects of food aid. The evidence that exists is quite indirect, following one of four channels.

The first, and most discussed pathway by which food aid might impact smallholder market participation, concerns its impact on foodgrains price distributions. By increasing aggregate supply, imported food aid almost always drives down local prices, although the extent of price decline is inversely related to the quality of targeting of food aid distribution to the poor and food insecure, for whom income elasticities of demand for food are highest (Barrett and Maxwell, 2005). Perhaps the greatest concern about transoceanic food aid shipments is that poor timeliness of deliveries may amplify price volatility in local markets. Lower prices, greater price risk, or both will typically discourage smallholder market participation, although it is essential to keep in mind that lower foodgrains prices benefit most rural Africans, especially poorer smallholders who are typically net grain buyers (ibid.; Levinsohn and McMillan, 2005). But the overall impacts of food aid shipments on foodgrains price patterns in Eastern and Southern Africa have varied markedly across countries and years (Donovan et al., 2006; Maunder, 2006; Tschirley, 2007).

A second possible effect of food aid likewise operates through market price distributions, but in this case through demand side interventions by agencies buying foodgrains under local and regional purchase schemes. A rapidly growing share of global food aid, now more than half of all non-US food aid, is purchased in the developing world as World Food Programme (WFP) local and regional purchases quadrupled from 1999 to 2005. Since WFP now conducts more than 75 per cent of all of its local and regional purchases in Africa, this new development is of particular pertinence to the region. Out of the 4 million metric tons of cereals food aid distributed in Sub-Saharan Africa in 2005, 1.3 million tons (exactly one-third) was sourced through local or regional purchases (WFP, 2006a). Food aid procurement in South Africa, Tanzania, Uganda and Zambia has grown especially rapidly, perhaps exceeding 20 per cent of marketed maize surpluses in Uganda in 2005 (Tschirley, 2007). In principle, local and regional purchases boost aggregate demand and can raise (and perhaps stabilize) foodgrains prices, inducing increased smallholder market participation, especially if purchases are coordinated through direct procurement from farmers' groups. While WFP aims to use local and regional purchases to help stimulate competition, farmer groups and food marketing infrastructure development in the region, the very limited empirical evidence to date suggests quite mixed impacts on the marketing system and on local prices (WFP, 2006b; Tschirley, 2007).

The third means by which food aid shipments might impact on smallholder foodgrains market participation rates has to do with impacts on farm productivity. While much popular discussion has emphasized 'dependency effects' and the alleged disincentive effects food aid has on smallholder producers, the best available empirical evidence that directly studies food aid's impact on farm productivity suggests this is not a problem (Abdulai et al., 2005; Lentz et al., 2005; Barrett, 2006). Indeed, well-targeted food aid that obviates seasonal liquidity and nutritional constraints may actually boost smallholder productivity and lead to increased, not decreased, market participation (Bezuneh et al., 1988; Abdulai et al., 2005).

The final, and most commonly overlooked, mechanism by which food aid might impact on foodgrains market participation has to do with induced transport cost effects. Because food aid shipments from ports (or regional procurement sites) to remote distribution centres tend to increase lorry backhaul capacity, they can drive down the costs of evacuating products from those areas. Furthermore, because food aid distribution is point based, it induces people to come to towns to receive assistance, thereby covering any fixed cost component to town-based sales of marketable surpluses. Food aid may thus decrease both household- and market-specific marketing costs for recipients. Very limited evidence from grain markets in Ethiopia (Negassa and Myers, 2007) and livestock markets in northern Kenya (McPeak, 2004) suggest such effects.

Overall, the limited and indirect evidence on the impact of policy and project interventions on smallholder foodgrains market participation reinforces the conceptual primacy of measures that reduce the structural impediments to exchange, that is, in improved institutional and physical infrastructure, and that improve smallholder access to productive assets and improved production technologies. Reinforcing feedback between market participation and improved technology adoption can compound the natural, one-off gains from such reforms, which generally appear far more promising than efforts based exclusively on trade or price policies. Reduced transactions costs and risk for households and marketing intermediaries, improved institutional and physical infrastructure, and increased competition all matter, probably more so than does price or trade policy directly.

4 CONCLUSIONS AND POLICY IMPLICATIONS

The empirical evidence from Eastern and Southern Africa suggests that most smallholders do not participate as sellers in staple foodgrains markets, at least not to any significant scale. Clearly there exist significant barriers to entry into commercial staple foodgrain markets that discourage significant sales by smallholder producers. In areas that are reasonably well integrated into the international market, conventional price and trade policies can work, subject to the standard caveats associated with the 'food price dilemma' (Timmer et al., 1983). But such policies will continue to draw marketed supply disproportionately from wealthier households that have the land, livestock, capital and improved technologies to generate significant marketable surpluses, even within these privileged regions. Such households presently account for the overwhelming majority of staple foodgrains sales. Entry barriers thus substantially reduce the reach of government price and trade policy, whether for the purpose of inducing supply response to promote exports or reduce import dependence, or with the aim of reducing rural poverty. Without complementary interventions to attend to the entry barriers that inhibit smallholder market participation, the impacts of conventional, top-down macro policies on smallholders are far more limited than policymakers might believe or wish. The evidence on anaemic smallholder performance in the wake of economic liberalization efforts provides abundant evidence in support of this claim.

Stimulating increased participation by most smallholders, and thus greater reach for price and trade policies in affecting food supplies and farming households' welfare, is likely to require interventions to address the entry barriers that impede foodgrains market participation. Smallholders face two basic classes of entry barriers. The first are micro-scale, associated with households' insufficient private access to productive assets, financing and improved production technologies with which to generate adequate marketable surplus to make market participation feasible and worthwhile. The consistently strong positive relationship across multiple countries, crops and years between net foodgrain sales and land holdings, livestock ownership, credit access or other measures of wealth underscores how important these endowment effects are to understanding patterns of smallholder market participation. This pattern is consistent with the semi-subsistence poverty traps hypothesis, wherein poor farmers lack the assets to produce marketable surpluses and therefore cannot reap the considerable gains attainable from market based exchange, which limits their ability to accumulate (or borrow) assets, reinforcing the initial condition and generating a low-level dynamic equilibrium (Carter and Barrett, 2006). Breaking out of such semi-subsistence poverty traps requires interventions to build up assets, facilitate uptake of technologies that increase the productivity of existing asset holdings, break down barriers to finance and market access that impede asset accumulation and technology adoption, or some combination of these.

The second class of barriers to entry occur at meso-scale. Especially in more remote areas, the high costs of commerce limit both household-level market access and market-level spatial price transmission and trader competition. The latter effect leads to thinner and more volatile markets, thereby limiting households' incentives to increase productivity so as to generate marketable surpluses. Traders have little incentive to incur large fixed costs to reach such households and regions, reinforcing households' inclinations towards semi-subsistence production for purely local market exchange. Once again, reinforcing feedback can lead to a low-level equilibrium trap. Investments in building up institutional and physical infrastructure at community and regional scale appear unusually important in addressing such entry barriers. Aggregate supply response to induced changes in transactions costs are likely to exceed those to price policy in many rural areas for the simple reason that inducing increased market participation by the large share of producers not presently engaged in markets appears the greatest prospective source of untapped marketed staple foodgrains supply in the region (Omamo, 1998a; Heltberg and Tarp, 2002; Renkow et al., 2004). Policies that reduce marketing costs for both households and for traders who intermediate between local rural markets and international and national markets, as well as interventions to expand uptake of improved technologies and increase the stock of productive assets controlled by smallholders, are thus essential complements to traditional trade and price policies for policymakers wishing to stimulate foodgrains supply, reduce poverty among smallholders, or both.

These results point to a three-pronged strategy for inducing increased smallholder market participation: macro- and sectoral-level price and trade policy for wealthier farmers in better integrated marketsheds, and micro- and meso-level interventions for poorer smallholders and regions less well integrated with national and international markets. Establishing the appropriate emphasis among and sequencing of the three is a context specific empirical task. And it is likely that synergies exist among these distinct policy tracks due to the spillovers that exist across scales of analysis. For instance, relieving micro- and meso-level constraints makes macro policy more effective and a more hospitable macro policy environment makes it easier to induce micro-level responses (Barrett and Swallow, 2006).

First, for the minority of farmers who already participate in foodgrains markets, one needs to study patterns of market integration and price transmission to establish where markets do and do not function effectively in transmitting excess demand and supply across space.[18] Macro and sectoral policies to promote supply expansion and uptake of improved technologies can be effective among these subpopulations in reasonably well functioning markets.

Second, one needs to establish when barriers to market participation depend largely on privately-held assets, for example, land, livestock or crop-specific capital, or production technologies needed to generate adequate surpluses to induce crop sales, and when they are more a function of meso-level institutional and physical infrastructure deficiencies. In the former case, the appropriate policy response would be improved access to financial services (credit, savings, insurance), technology transfer, and asset building programmes, for example, livestock transfers or food-for-work projects to invest in on-farm soil and water conservation structures (Holden et al., 2006). In the latter case, one needs to invest in remedying local infrastructure deficiencies, whatever they might be (roads, communications, police protection and so on). The limited evidence that tries to weigh the merits of these different interventions tends to place primary importance on privately held assets as the greater constraint to market participation and rural poverty reduction (Boughton et al., 2006; Cadot et al., 2006; Minten and Barrett, 2006), although the evidence remains at best suggestive.[19] This is an exceedingly important question that merits more attention from researchers.

Finally, policymakers must bear in mind that policies to stimulate productivity growth and commercialization in smallholder agriculture must be coupled with policies to absorb those who will inevitably exit farming as part of the agricultural transformation. Not everyone has the scale or the skill to make it in commercial farming. This implies a need for complementary investment in 'trade adjustment assistance' for poorer smallholders in the form of health and education investments that build and protect human capital so as to improve their labour productivity and employability off the land. Increased smallholder market participation will inevitably go hand-in-hand with increased smallholder migration out of agriculture, and in some cases out of rural areas, following the familiar path of agricultural transformation.

NOTES

1. I thank Russell Toth for helpful research assistance, Marc Bellemare, Duncan Boughton, Bart Minten, Chris Moser and Emma Stephens for helpful insights, and the United States Agency for International Development's Strategies and Analyses for Growth and Access (SAGA) cooperative agreement for financial support. Any errors are mine alone.
2. There remain open disagreements within the development and research communities as to whether the problem has been incomplete liberalization or reversal of liberalization measures, or whether the problem is that liberalization as prescribed and practised was insufficient to ignite broad-based economic growth and poverty reduction. This chapter abstracts from that debate.
3. Barrett and Carter (1999) make a similar case with respect to an earlier generation of policy debates about structural adjustment and related market-orientated liberalization programmes.
4. Households will not both buy and sell the same crop in this simple, one-period model

because of the price wedge created by transactions costs, so there exists a complementary slackness condition, $M^{cb} \cdot M^{cs} = 0$, at any optimum.
5. This obviously renders transactions costs endogenous. Another way to allow for the possible endogeneity of transactions costs is to allow for multiple marketing channels and farmers choose which, if any, to enter. In this latter spirit, Fafchamps and Hill (2005) study how Ugandan coffee farmers choose between trader pick-up at farmgate and self-transport to market when selling their output.
6. This model abstracts completely from risk issues. The extension to production and/or price risk is straightforward and simply reinforces the core points that follow, as the literature on investment under uncertainty in the presence of sunk costs demonstrates (Dixit and Pindyck, 1994).
7. This assumes that households make simultaneous discrete market participation (autarky, buyer or seller) and continuous purchase or sales volume choices, conditional on market participation. Bellemare and Barrett (2006) discuss the distinction between sequential and simultaneous choice and present empirical evidence on livestock producers in Ethiopia and Kenya.
8. This obviously assumes a small economy that takes world market prices as given.
9. A substantial literature on spatial price analysis, market integration and price transmission explores these issues in detail. See Fackler and Goodwin (2001) for a detailed overview and Abdulai (2007) for a recent review of the evidence as it relates to Eastern and Southern Africa. An important but often-overlooked issue in the price transmission literature concerns the degree of competition among marketing intermediaries. In imperfect competition, price transmission might be highly asymmetric, with traders passing on higher input prices to farmers, but not higher crop output prices. The very thin literature on this topic finds some evidence of bottlenecks in particular links in the marketing channel or in particular locations (Barrett, 1997; Minot, 1998; Moser et al., 2006) in Madagascar and Rwanda.
10. Deaton (1997) explains how cross-section unit value differences might reflect endogenous quality differences, but under the maintained hypothesis that household-level transactions costs are zero.
11. At the sectoral level this also relates to Hirschman's (1958) idea of backward and forward linkages, which likewise rest fundamentally on the notion of pecuniary externalities linked to economies of scale, and on what Fleming (1955) referred to as 'vertical' external economies associated with the cost effects associated with expanded intermediate goods production. When supply expansion of an industry drives down input prices for a downstream sector with which it has a trading relationship, not only can it have a multiplier effect, but in the presence of fixed and sunk costs it can also make emergence of entire sectors suddenly profitable, leading to very large social returns to investment in the upstream sector. Johnston and Mellor (1961) seized on this idea to make the case for massive investments in improving agricultural technologies so as to drive down input prices in post-harvest value-added activities (for example, canning, milling, food processing, textiles or leather production) and stimulate the non-farm sector. Timmer (1988) develops these ideas further in his discussion of the agricultural transformation.
12. Stephens and Barrett (2006) seek to explain, in particular, the 'sell low–buy high' phenomenon, wherein smallholders sell crops in the immediate post-harvest period when prices are low, only to buy back the same commodity a few months later when prices are sufficiently greater that conventional discount rate or storage loss explanations seem grossly insufficient to explain the puzzle. Aside from pure net buyers (that is, those who never sell crops), the most common maize marketing pattern in their data was 'sell low–buy high'.
13. Thanks to David Mather for generating this nonparametric Nadaraya–Watson regression with bandwidth = 3.5 and an Epanechikov kernel. A version of this plot appears (nested with similar plots for cotton and tobacco sales) in Boughton et al. (2006).
14. The difference between the two reflects storage and interhousehold transfers, indicating

that households routinely save or give away a statistically significant share of their output once they get to a net benefit ratio of 0.10 or more.

15. For higher-value commodities, the same strong relationship between household endowments of productive assets and gross or net sales position holds. For example, Holloway et al. (2000, 2005) find a strong relationship between dairy sales and both herd size and adoption of higher-yielding cross-bred breeds in the Ethiopian highlands. Bellemare and Barrett (2006) similarly find that household assets and herd size have a strong positive affect on pastoralists' livestock sales in southern Ethiopia and northern Kenya. And Neven et al. (2006) find that landholdings are the key determinant of participation in high-value horticulture contract farming with supermarkets in Kenya.
16. Evidence from other, higher-value commodities reinforces the impression that transactions costs that appear quite high relative to the price fetched by or paid for a commodity play an important role in explaining low rates of smallholder participation in staple foodgrain markets in Eastern and Southern Africa. For example, even in remote pastoralist areas of southern Ethiopia and northern Kenya, where extraordinarily high transport and security costs drive substantial wedges between local and terminal (Nairobi and Addis Ababa) prices, virtually all households sell livestock to market. But even in a setting with negligible supporting institutional or physical infrastructure, and even though a majority of sales were for only one animal (thus, no spreading of fixed costs across multiple units), marketing costs amounted to less than 6 and 9 per cent of pastoralists' livestock sales revenues in Kenya and Ethiopia, respectively. Thus, over the two-year period 2000–02, 92 per cent of Kenyan households and 87 per cent of Ethiopian ones sold livestock (Barrett et al., 2006).
17. Conversely, recent rural road improvements by the government of Madagascar induced the main horticulture exporter to extend the geographic reach of its contracting with small farmers, drawing in an estimated 1,000 additional growers in a single year (Minten et al., forthcoming).
18. See Moser et al. (2006) or Abdulai (2007) for discussion of and evidence on such issues.
19. Public goods and services do not appear as important in these studies, but that could well be because there is insufficient variation in these variables in cross-section, especially once one controls for other covariates (for example, agro-ecological conditions, prices) that are often highly collinear with the provision of the physical and institutional infrastructure necessary to make markets work for the rural poor.

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4. Governance and surplus distribution in commodity value chains in Africa

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1 INTRODUCTION

Recent policy discussions have emphasized the importance of the staple food crop sector in Sub-Saharan Africa in increasing farm productivity to achieve food security and to alleviate poverty (see, for example, the Summit on Food Security in Africa in Abuja, Nigeria in December 2006). A crucial issue in the debate is how the staple food sector can generate surpluses and how to ensure an equitable distribution of these surpluses.

In this chapter, it is argued that the governance of food markets and commodity chains is a crucial element for efficiency and distributional effects, including for growth and food security – and that the chain governance itself is endogenous in an environment of weak contract enforcement and imperfect markets, and importantly depends on the value in the chain (and on other commodity characteristics). Supply chain governance, or the way economic transactions in supply chains are coordinated (Gereffi et al., 2005), is crucial in determining how economic surpluses are generated and distributed along the chain. There is large variation in the way in which food and agricultural commodity chains are governed, with the involvement of the public sector and/or different private agents and varying levels of vertical coordination between those actors. It has been argued, and empirically demonstrated, that the degree of vertical coordination in supply chains indeed influences economic outcomes, in particular efficiency and equity (Swinnen and Maertens, 2007).

To show how the value in the chain determines the governance of the chain and how surpluses are distributed along the value chain, a conceptual model, based on the theory developed more formally in Swinnen and Vandeplas (2007) is used. The predictions of the theory are then compared with empirical evidence on governance of different commodity chains in

Africa. In combination, this allows an understanding of the constraints on growth in staple food chains and the identification of policy implications.

Our approach involves several key aspects. First, we develop a general model of value chains to allow comparisons across different commodity types. To understand what is (not) occurring in the staple food sector it is essential to focus not merely on the staple food crop sector, but to relate and compare its characteristics and economic performance to other agricultural subsectors. For this purpose we use a simple commodity classification identified by Poulton et al. (2006),[2] and focusing on three types of agricultural market: staple food crops (such as grains, tubers), traditional export commodities (such as coffee, cocoa, tea, cotton), and non-traditional exports (such as fresh fruits and vegetables, fish and seafood products). As will become apparent in the next sections, these commodity groups have specific characteristics that are important in explaining the governance structure of value chains.

Second, we explicitly use an 'interlinked market' approach. The literature on supply chain governance (for example, Dolan and Humphrey, 2000; Kirsten and Sartorius, 2002; Swinnen, 2005; Swinnen and Maertens, 2007) often draws a distinction between market- and contract-based governance.[3] However, from our perspective the key issue is not whether produce is supplied through spot markets or through contracts but whether transactions are made in one single market (the output market) or whether different economic transactions are interlinked.[4] Interlinking[5] occurs when, next to the exchange of primary produce, buyers and suppliers agree on inputs, credit, extension and so on to be delivered as part of the contract. We shall show that the occurrence of interlinked market governance strongly depends on the commodity value and has important effects on efficiency and equity in agricultural supply chains.

Third, we explicitly integrate two important aspects of the developing country institutional environment into the model: market imperfections and weak enforcement mechanisms. The functioning of markets (highly imperfect in many countries in Sub-Saharan Africa (SSA)) and the contract enforcement environment (often very weak in developing countries) play an important role in the emergence of specific systems of supply chain governance. These institutional aspects are therefore specifically accounted for. We shall show that market imperfections and weak enforcement institutions are important in determining the distribution of surpluses in commodity value chains.

The structure of the chapter is as follows. First, we describe the development of supply chain governance systems from a historical perspective. Second, we highlight the development of supply chain governance for different types of commodities. Third, we develop a conceptual model that theoretically describes how surpluses are distributed along the value chains depending on the emerging governance patterns and commodity value. Fourth, the theoretical outcomes of the model are confronted with observed patterns of governance and surplus distribution in different types of commodity chains. Finally, we specify the policy implications of our findings.

2 A HISTORICAL PERSPECTIVE ON SUPPLY CHAIN GOVERNANCE

State-controlled Governance

Most African countries were characterized by state-controlled supply chains for agricultural and food commodities in the decades after independence from colonial power.[6] Governments were heavily involved in agricultural marketing and food processing through the creation of marketing boards, (para)state processing units, and government-controlled cooperatives (for example, in Tanzania). State-controlled governance was particularly common for basic food crops (most importantly grain) and important export crops such as coffee, cotton and tea.

State involvement in the production and marketing of staple food crops was most extreme in Eastern and Southern African countries while in West Africa, marketing boards and (para)state companies intervened heavily in the supply chains of export crops but were less influential in grain markets (Kherallah et al., 2002). Marketing of grain and other basic food crops was controlled by government marketing boards, for example, in Malawi through ADMARC (Agricultural Development and Marketing Corporation); in Zambia through NAMBOARD (National Agricultural Marketing Board); and in Kenya through the NCPB (National Cereals and Produce Board). State governance in the processing and marketing of major export crops was evident, for example, in the cotton sector in Cameroon (SODECOTON), Ghana (Ghana Cotton Development Board), Kenya (Cotton Lint and Seed Marketing Board) and Malawi (Malawi Textile Development Company); the coffee sector in Uganda, Kenya, Zimbabwe and Ethiopia; and the tea sector in Kenya (Kenyan Tea Development Cooperation).

The dominant form of state governance in agro-food supply chains was that of seasonal input and credit provision to small farmers in return for supplies of primary produce. For example, the government marketing boards ADMARC in Malawi and NAMBOARD in Zambia provided seasonal inputs to peasant farmers deducting the value of the inputs from the payment made for marketed output at harvest time. Also parastatal cotton companies such as CMDT (Compagnie Malienne pour le Développement du Textile) in Mali, SODECOTON in Cameroon and the Ghana Cotton Development Board provided credit and inputs to cotton farmers (Poulton et al., 1998). Hence, government marketing organizations and parastatal processing companies dealt with farmers through interlinked transactions in output, input and credit markets. Also, extension services were often part of these interlinked transactions. For example, the Ghana Cotton Development Board also provided extension services (Poulton, 1998) and the Kenyan Tea Development Authority was involved in effective control at all levels of the operation including planting material, production processes, quality control and extension services (Bauman, 2000).

State control in agricultural supply systems was often motivated on political grounds and by the objective of extracting government revenues from the agricultural sector. Until the 1980s there was a strong bias against agriculture in the policies of many countries in SSA. Agriculture was viewed as a backward sector that could not take the lead in realizing economic growth. The emphasis was on food self-sufficiency and industrial export growth. Governments intervened in agricultural supply chains and markets basically to tax agriculture, both directly and indirectly, maximize foreign exchange earnings, and provide cheap food for urban consumers and industrial workers.

The bias against agriculture in government policy has resulted in low agricultural growth rates. The system of state governance in agricultural supply chains led to situations where government institutions were monopoly buyers of agricultural products (especially basic food crops and important export crops) and the only source of input and credit provisions for peasant farmers. Consequences for local farmers were very low agricultural prices and limited production incentives. Moreover, marketing boards bore high costs of transport (due to pan-territorial pricing policies) and of storage (due to pan-seasonal pricing policies). Marketing boards are often mentioned as having been highly inefficient due to corruption and bureaucracy which led to serious financial problems (Kherallah et al., 2002). Also late payments to farmers and very low credit repayment rates were in general characteristic of state governance systems. However, some studies also point at successful state supply chain governance. For example the contract-farming schemes of the Kenyan Tea Development Authority are referred to as a success story, which is attributed to its extensive form of interlinking (Bauman, 2000).

The Fall of State-controlled Governance

In many parts of SSA the described system of state-controlled governance in agricultural supply chains collapsed during economic reforms in the 1980s and 1990s. Processes of privatization and liberalization were to remove the state control in agricultural commodity chains, provide competition and ensure efficiency. In most countries, the monopoly status of government marketing boards and parastatal processing units was removed and private traders were allowed to engage in agricultural trade. Many government marketing boards, cooperatives and (para)state processing units collapsed, were privatized or were transformed. For example in Ethiopia, the parastatal Agricultural Marketing Corporation (AMC) which strictly controlled grain trade was transformed into the Ethiopian Grain Trade Enterprise, a government buffer stock scheme. In Mali, the official monopoly of the state agency Office des Produits Agricoles du Mali (OPAM) collapsed and its role was reduced to managing a strategic food reserve, distributing food aid and sales of grain in remote areas. In Nigeria, the Nigerian Cocoa Board collapsed as did the parastatals for oil, palm, rubber and peanuts. The coffee marketing boards in Uganda and Tanzania were transformed into the Ugandan Coffee Development Authority (UCDA) and the Tanzanian Coffee Board (TCB), respectively, with purely regulatory functions. The Ghana Cotton Development Board was privatized into the Ghana Cotton Company (Kherallah et al., 2002).

Economic reforms are not yet complete, and in most countries in SSA the government is still involved in agricultural supply chains in a variety of ways, for example, through parastatal companies and marketing boards or through minority shares in privatized food processing companies, through state-owned banks and government credit schemes, provision of extension services and so on. However, in general, due to the economic reforms since the 1980s, there has been a shift away from state governance in agricultural supply chains towards other forms of governance, mainly market-based governance involving private companies and interlinked markets. The degree to which this shift has occurred and the governance systems that have appeared are commodity specific and are discussed in the next section.

3 A COMPARATIVE PERSPECTIVE ON RECENT COMMODITY CHAIN GOVERNANCE

In this section we discuss the variation among commodities (and across countries) in the recent governance systems of agricultural supply chains. We consecutively discuss the staple food crop sector, traditional export crops and non-traditional export crops.

Staple Food Crops

State-controlled governance systems are still most prevalent in the supply chains of staple food crops. Government interventions such as price controls and trade restrictions have been abolished in most countries (except for government price control in Malawi, Tanzania and Zimbabwe; and trade restrictions in Benin, Ghana, Madagascar and Tanzania). However, in most countries, government marketing boards still exist. They continue to be main players in the grain markets of a number of countries. In Malawi for example, ADMARC remains dominant in the maize market despite the closure of a number of buying centres. In Mali, parastatal rice milling companies are only slowly being privatized and remain active and influential. In most countries in SSA, however, the importance of marketing boards and parastatal processing companies in the staple food supply chains has decreased and privatized trading systems have emerged. Liberalization has prompted large numbers of small informal traders to enter into grain trade in most countries in SSA. For example, it was estimated by Negassa and Jayne (1997) that the Ethiopian Grain Trading Enterprise, created from the AMC, accounts for less than 5 per cent of the cereals marketed by peasants. In Benin only 0.15 per cent of the traded volume maize is controlled by the Office National d'Appui à la Sécurité Alimentaire (ONASA), created from the parastatal Office National des Céréales (ONA). By contrast, in Malawi where ADMARC is still dominant in the maize market, small private traders are active but engage mainly in bulking for ADMARC.

The private traders that have emerged in the staple food sector generally have limited capacity to innovate, poor access to credit and other resources, and limited storage capacity (Coulter and Poulton, 2001) and tend to rely on social and ethnic-based networks (Fafchamps and Minten, 2001). Private grain traders rely on simple spot market transactions to trade produce. In fact, the private sector operations are characterized by limited capital, a low degree of specialization, and the absence of long-term investment, including interlinked market relations. Private sector interlinking is largely absent and the government is still an important source of input and extension provision in many countries. For example, in Malawi, ADMARC still distributes 61 per cent of the fertilizer used by small farmers (Minot et al., 2000). In Zambia, over half of the fertilizer used is supplied by the Food Reserve Agency at pan-territorial prices (Jayne et al., 2003). The governance system of grain markets in SSA is characterized by a combination of the remainders of state governance and private simple market governance without interlinking.

The effect of the reforms on the performance of the staple food crop sector depends in large part on the extent of the changes. In many countries in SSA, marketing margins in the staple food crop sector remain high (for example, in Tanzania and Ethiopia). In addition, growth in per capita staple food crop production has been modest in most countries and negative in some countries (for example, in Tanzania, Zimbabwe and the Gambia). Moreover, the use of inputs such as fertilizers and improved seeds has declined in some regions (Kherallah et al., 2002).

Traditional Export Crops

During colonial periods, cash crops such as coffee, cocoa, cotton, tobacco and tea were mainly grown by smallholders in West Africa and on large industrial estate farms (owned by western settlers) in Eastern and Southern Africa. After independence however, smallholder cash crop production expanded under state-controlled governance systems and outgrower schemes. Delgado (1995) estimated that since the 1970s at least 90 per cent of traditional export crop production in SSA has been carried out by smallholders.

In the past 15 years, there has been a remarkable shift from state governance in the supply chains towards private governance systems organized around private trading and processing companies. The removal of the monopoly status of (para)state processing companies and government marketing boards, has in most countries and for most commodities resulted in an inflow of private capital into export crop processing and marketing. For example, in Tanzania and Uganda the collapse of the coffee marketing boards resulted in private investment in coffee marketing. By 1997, about 75 per cent of coffee trade in Tanzania, including the best quality, was handled by private traders. Also in the cashew nut sector, trade liberalization and the collapse of state-owned processing companies, caused an inflow of private traders (mostly selling raw nuts directly into export markets). In Tanzania, private traders accounted for more than 90 per cent of cashew nut trade in 1997 while the 12 state-owned processing factories were completely abandoned. The privatization of the Ghana Cotton Development Board into the Ghana Cotton Company and liberalization in the cotton sector has caused private companies to invest in the sector, resulting in increased competition (Poulton, 1998). In Tanzania, the majority of cotton (60 per cent) is also processed by private cotton gins (Kherallah et al., 2002).

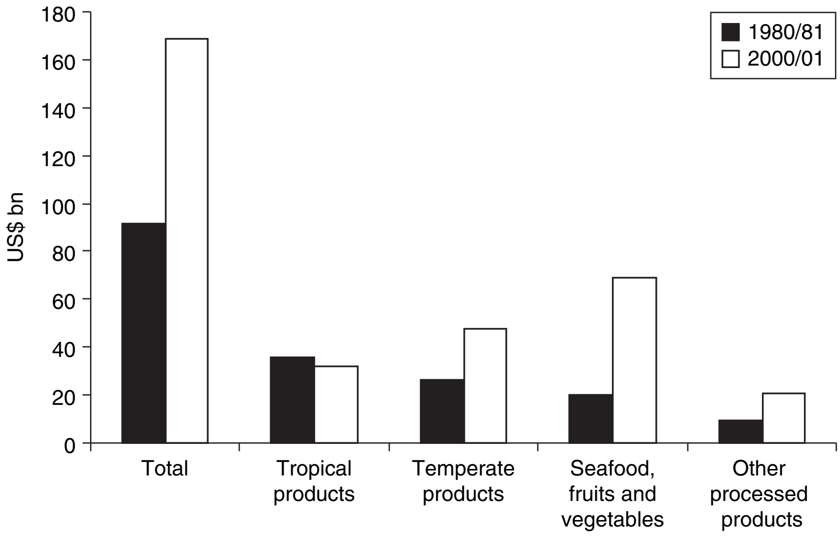
As a result of privatization and market liberalization, state-controlled governance of export crop supply chains gradually lessened and finally ceased to exist. Instead, supply chains developed around private companies such as traders, exporters and processors. The private forms of governance often involve interlinked markets. For example, increased competition in the Ghana cotton sector has induced private companies to improve their services to farmers, including timely ploughing services, reliable fertilizer and pesticide supplies, prompt payment after harvest and even ploughing for farmers' food crops (Poulton, 1998). In some cases, multi-party arrangements with government institutions have occurred. For example, in the coffee sector in Tanzania, the private interlinked market governance involves arrangements with a state cooperative bank. In some sectors, state- and private-governed supply chains coexist (for example, cotton in Tanzania) but they usually operate in different regions of a country.

While for most crops and in most countries state-controlled export crop marketing and processing is making way for private market-based government, this is not the case for cotton in some West African countries, where parastatal companies remain active, handle the majority of the crop and govern the supply chains. In Mali, the CMDT has preserved its monopoly status in cotton processing and marketing, and remains the sole provider of seeds, chemicals, fertilizer and extension services.

The shift away from government intervention and state control over export crop supply chains has had major implications. First, it is reported that in the period after the reforms, the production and sale of African traditional exports grew by 30 per cent in volume in the 1990–97 period (Townsend, 1999). Second, market liberalization and the shift in the governance system has improved the availability and access to inputs and credits (Kherallah et al., 2002). Third, there have been major changes in the distribution of surpluses. Real producer prices for traditional African export crops increased substantially. For example, producer prices for coffee increased by 9.8 per cent annually in Cameroon and by 14.1 per cent in Senegal in the 1990–97 period. In the same period, real producer prices for cotton increased by 5.9 per cent in Tanzania. However, sectors where the shift away from state-governed supply chains has not yet occurred are worse off. For example, the annual increase in cotton producer prices was only 2 per cent in Benin and 0.8 per cent in Mali, both countries where the cotton sector is still state controlled. Often, marketing margins for export crops have decreased while the producer's share of the price has increased. For example, the producer's shares have increased to more than 70 per cent in the coffee and cocoa sectors in Cameroon, Nigeria, Tanzania and Uganda. However, the producer's share remains relatively low for cotton in Benin (37 per cent) and Mali (44 per cent).

Non-traditional Export Crops

The expansion of a non-traditional export sector is a recent phenomenon. Since the 1980s, the structure of developing country agricultural exports



Source: Calculated from Aksoy (2005).

Figure 4.1 The structure of developing country agricultural exports, 1980/81–2000/01

has changed significantly with non-traditional export crops increasing sharply in importance (Figure 4.1). These non-traditional export crops are typically high-value commodities such as fresh and processed fruits and vegetables, and fish and seafood products. These products now account for more than 40 per cent of total agricultural exports from developing countries while their share was only 21 per cent in 1980.[7] In SSA, these non-traditional exports are important in a number of countries, for example, in Kenya, Senegal, Madagascar, South Africa and Ethiopia.

Non-traditional export supply chains are completely controlled by private companies. Since these supply chains developed only recently, mainly after 1980 when many liberalization and privatization reforms had already been implemented, state involvement in these sectors has been much more limited than for traditional exports. Contrary to the traditional export crop sector, large supermarket chains play an important role in the supply chains of high-value commodities. In addition, the degree of vertical coordination and the occurrence of interlinking is very high in the supply chains of non-traditional exports. For example, in Senegal, extensive forms of market interlinking are observed in the export vegetable sector (Maertens and Swinnen, 2009). Exporting companies provide peasant farmers with inputs, credit, and extension and management services in return for timely and high-quality supplies of French beans. In Madagascar, a private company provides inputs and extension services to 10,000 small horticulture farmers under contractual arrangements (Minten et al., 2006).

The development of non-traditional export sectors in some countries in SSA has had major positive welfare implications. Although some authors argue that the poorest and smallest farmers are excluded from these privately governed supply chains (for example, Reardon et al., 2003), in general farmers are receiving high prices for high-quality products which importantly contribute to rural incomes (Maertens and Swinnen, 2009; Minten et al., 2006).

Supply systems for staple food crops are governed through the remainders of state-controlled governance or through simple market-based governance or, in most cases, a combination of both. Second, for traditional exported commodities there has been a shift from state governance to private market-based governance, often with interlinking of markets. Third, high-value non-traditional exports have grown in importance over the past 20 years, and are primarily based on private governance systems with interlinked markets.

In the next sections we shall show that differences in product value, the degree of competition in a marketing system, and other characteristics such as the perishability of the products, are key in explaining the observed differences in supply chain governance. Moreover, these differences in governance systems are crucial in determining how much surplus is created and how it is distributed along the value chain.

4 CONCEPTUAL MODEL

In this section, we present a conceptual model to explain the observed differences in commodity chain governance, in particular the (lack of) emergence of interlinking and the distribution of the created surplus along the value chain.

Consider the situation where a local household or farming company, 'the farmer', can sell farm products to a trader or a company, 'the buyer'. This buyer sells the product (after transporting, processing, retailing and so on) to consumers, either domestically or internationally. Let θ represent the value that is created by this transaction.

The production of commodities for the market requires some specific input use (for example, fertilizers, credit, seeds and technology). Assume that to produce one unit of output, the farmer requires specific inputs with a value of I in addition to standard production cost for subsistence production (for example, labour, land). These specific inputs are assumed to be unavailable to the farmer because of factor market imperfections. This assumption reflects the situation in many developing countries where local producers and households face important factor market constraints. These imperfections prevent farmers from producing for the market and this constrains access to raw materials for the buyer. If the buyer has access to the required inputs, he/she can act as an intermediary in the input market and provide (sell or lend) the inputs to the farmer. This, again, is a realistic case since the buyer may have better collateral, greater cash flow or face lower transport or transaction costs in accessing the inputs. If so, the buyer will consider offering a contract to the farmer, which includes the provision of inputs and the conditions (time, amount and price) for purchasing the farmer's product. We assume that either the buyer provides the farmer with the full amount of required inputs I per unit of production, or the buyer does not provide any inputs.[8]

If enforcement is costless, we assume that the contract surplus is shared equally among agents.[9] The contract surplus S is defined as the surplus created by the contract over the sum of the initial outside options of the contracting agents, and equals $S = \theta - I$. Each agent receives his/her outside option and one half of S.

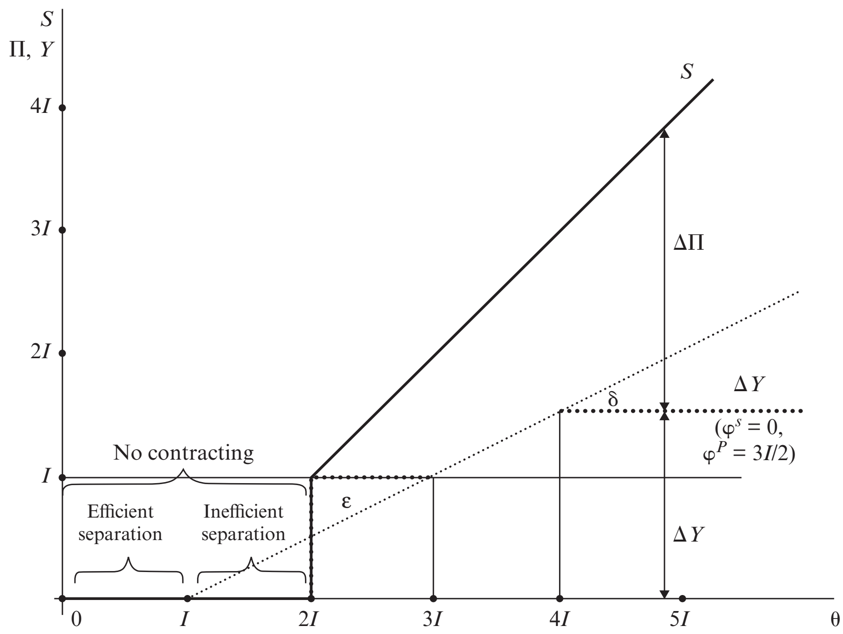
However, when enforcement is costly, it is no longer certain that contracts will be honoured. We consider the extreme situation where there are no external enforcement institutions, which is equivalent to assuming that external enforcement is prohibitively costly. On the one hand, the farmer can divert the inputs to other uses, such as selling them or applying them to other production activities, or applying the inputs as agreed but then selling the high-quality output to a competing buyer at a higher price. In the case where buyer specificity ($1/\gamma$) of the high-value products is not prohibitively high, these other buyers may be able to offer higher prices to the suppliers because they do not need to charge a price discount for the inputs received on credit. However, if the farmer breaks a contract, he/she may suffer a loss in terms of reputation, or social capital, or opportunities for future trade. We denote this reputation loss by φ^s. φ^s may, for example, be larger if buyers intensively share information on defaulters (for example, Fafchamps and Minten, 1999).

For farmers to voluntarily comply with the contract, their income from the contract must at least be as much as their outside option, obtained from breaching the contract and selling elsewhere. Swinnen and Vandeplas (2007) show how this is equivalent to the concept of 'efficiency wages' (Salop, 1979) – where employers pay a higher wage to their employees to minimize the employees' incentive to quit and seek a job elsewhere – and define the difference between the producer price under costless enforcement and under prohibitively costly enforcement as an 'efficiency premium'. The higher the specific inputs cost I, or the higher the price that competing buyers offer for the farmer's produce on the local market, the higher this efficiency premium must be. The farmer's reputation cost can put a brake on opportunistic behaviour, as the outside options for contract breach are reduced by an amount φ^s. In this case, the efficiency premium decreases.

On the other hand, the buyer could as well behave opportunistically, by paying a lower price to the farmer than was originally agreed on, or by postponing payment, a common practice in reality (Kydd and Dorward, 2004; Poulton et al., 2006; Swinnen, 2007). If the processor behaves opportunistically, he/she can appropriate the contract surplus up to the farmer's outside option at that moment, minus the own reputation loss (φ^p) from breaching the contract. This is more likely to happen if reputation costs are low and the alternative sales options for the farmer are poor (compared to the value to the processor). The maximum surplus share that a farmer can expect to receive equals the reputation cost of the buyer.[10] Note that what is going on in this case is that the equivalent of a *negative* efficiency premium (δ) is paid by the farmer to the buyer in high-value chains to make the contract sustainable. Obviously, the farmer will foresee that the buyer can act in such a way. If the *ex post* renegotiated price is lower than the payoff the farmer can gain through input diversion, the farmer will be first to breach the contract. More generally, with opportunistic behaviour by the buyer, not all contract conditions are credible and the surplus distribution is constrained.

Figure 4.2 shows under which conditions a contract is agreed upon and enforced (implying the creation of surplus) and the subsequent distribution of the contract surplus.[11] Whereas ΔY denotes the share of the surplus accruing to the farmer, $\Delta\Pi$ is the buyer's share. We illustrate the case where the respective reputation cost of the farmer and the buyer are $\varphi^s = 0$ and $\varphi^p = 3I/2$.

Efficient separation occurs for $\theta < I$, where the extra value created by the contract is too small to justify the specific inputs cost. However, for $I < \theta < 2I$, contracts break down although they could be profitable for both agents: *inefficient separation* occurs. The reason is that for $I < \theta < 3I$, the farmer has an outside option that is more attractive than that achievable under an equal division of the contract surplus S. So this is what the buyer should ultimately offer the farmer under the contract as well, by means of an efficiency premium ε on top of his/her usual surplus share. This obviously requires that $S \geq I$, for the buyer's participation constraint (PC) to remain satisfied at the same time. If $I < \theta < 2I$, then $0 < S < I$, hence inefficient separation occurs. For $2I < \theta < 3I$, the buyer is able to



Source: Swinnen and Vandeplas (2007).

Figure 4.2 Surplus sharing under two-sided hold-ups

pay the farmer an efficiency premium that covers the difference between his/her equal division outcome and his/her outside option. The rest of the surplus will then accrue to the buyer. As a result, over the interval $2I < \theta < 3I$, the surplus going to the farmer is constant at $\Delta Y = I$. Note that without an efficiency premium, ΔY would range from $0.5I$ to I. The share going to the processor increases from 0 to I over this interval. For $\theta > 4I$, ΔY remains constant at $\varphi^p = 3I/2$. The rest of the surplus is appropriated by the buyer.

This model leads us to conclude that opportunistic behaviour affects (a) the frequency of inefficient separation and (b) the division rule for surplus sharing. When enforcement gets costly, and reputation costs are low, inefficient separation appears. If the value in the chain (θ) is sufficiently high, this can be overcome by paying an efficiency premium (either positive or negative). For lower values of θ, the risk for hold-up behaviour by the farmer is particularly high, hence he/she will benefit from the efficiency premium. For high-value chains, the risk for hold-up behaviour by the buyer is high, hence the efficiency premium will accrue to the buyer.

In general, the implications for surplus sharing are as follows: farmers will receive a higher income when, *ceteris paribus*, (a) the value in the chain (θ) is higher, (b) their opportunity costs of signing the contract as well as of honouring the contract once it has been signed are higher and (c) when their reputation cost is lower. But inefficient separation will still occur (a) if the value θ is low, (b) if reputation costs (φ^s and φ^p) are low and/or contract enforcement is difficult (costly), and (c) if there are plenty of alternative sales outlets.

Impact of Competition

If other buyers of high-value products enter the market, the contracted buyer will experience competition. First, the buyer will experience competition *ex ante*, while negotiating a contract with the supplier. This will increase the supplier's *ex ante* outside option, and hence his/her payoff. The value of this outside option depends on the respective transaction costs that the buyer and supplier face in switching contract partners, and the probability that each has to find a new contract partner.

Second, the buyer will experience competition *ex post*, when other buyers try to lure away suppliers already under contract. More competition may be reflected in a reduced buyer specificity (hence, a higher γ). As a result, the efficiency premium that a buyer needs to pay his/her supplier in order to secure their contract, increases. However, the higher this efficiency premium, the higher the probability also that the output value will not suffice to cover both the required efficiency premium and the buyer's participation constraint. If it does not suffice, inefficient separation follows.

Finally, competition between buyers may also have an impact on reputation costs φ^s and φ^p on the value θ in itself, which we had earlier considered to be exogenous to the model. Indeed, the number of agents operating in the market is expected to negatively affect the penalty for contract breach (Hoff and Stiglitz, 1998), because the threat of cutoff from future contract arrangements is less stringent, as there are other contract partners available. This argument is in line with Eswaran and Kotwal (1985, p. 196), who state that reputation is an effective weapon against moral hazard only for suppliers 'of those factors that are in excess supply'. In other words, a higher demand for the supplier's produce lowers his/her reputation cost from breaching a contract.

A second reason why the penalty for breaching a contract is lower with more competition, is that reputation effects are less prevalent in a competitive market, where agents are less likely to coordinate and share information (see also Zanardi, 2004). This will make it easier for an opportunistic supplier to find an alternative buyer. Local information networks work less well when the number of agents expands, as it costs more in terms of effort, money, and/or time for information to spread among a larger group of agents.

The value θ may also be affected. If more competing processors enter the market to seize a part of the rents, consumer market changes may no longer be ignored. As the supply of high-quality products to final consumers increases, the value, and hence the contract surplus, will fall. This will lead to decreased incomes for both the supplier and the buyer.

Impact of Commodity Characteristics

In addition to the structure of the market, commodity characteristics can also influence the occurrence of interlinking. Relatively bulky commodities are easy to transport while other products require more care (and hence higher costs) to transport. Higher transport costs may reduce the likelihood of opportunistic sales (especially when road infrastructure is poor and potential buyers scattered) and therefore decrease the occurrence of contract breach and hold-up. Likewise, commodities which are more difficult to store or which are more perishable are less suited for opportunistic sales, resulting in easier contract enforcement for such products.

5 IMPLICATIONS FOR COMMODITY CHAIN GOVERNANCE AND SURPLUS DISTRIBUTION

The theoretical model discussed above can provide some answers as to why, after the agricultural reform processes in SSA, interlinked private contracting has appeared in certain sectors but not in others. As explained in Section 3, there is a large variation in the governance system in agricultural markets. The staple food crop sector is characterized by the remainders of state-controlled governance and simple (non-interlinked) private market transactions; the traditional export crop sector is governed through state-controlled and/or private interlinked contracts; and the non-traditional export sector is primarily based on private interlinked transactions.

In line with the results derived from our model, these differences in supply chain governance can be explained by (i) differences in value across the commodity types, (ii) differences in the level of competition in the sectors, and (iii) differences in the perishability and bulkiness of the traded produce. Based on our model, we expect to find more extensive private market interlinking when the value (or quality) of the traded produce is higher, when there is less competition and when products are more perishable and less bulky. Based on these insights, we provide some hypotheses

Table 4.1 Commodity characteristics and supply chain governance across different commodity types

	Examples	Value	Degree of competition	Perishability (in general)	Supply chain governance
Staple food crops	Grains, roots, tubers	Low	High	Less perishable	Simple market governance
Traditional export commodities	Coffee, tea, cocoa, cotton	Medium	Low	Less perishable	State governance with interlinking
Non-traditional export crops	Fruits, vegetables, fish, meat	High	Low	More perishable	Private governance with interlinking

as to why, after the agricultural reforms in Southern and Eastern Africa, linkages between input delivery, farm finance and crop sale has been established for some types of commodities, but not for others. This is summarized in Table 4.1.

Staple Food Crops

In the staple food crop sector, separation (whether efficient or inefficient) is likely to occur because of a relatively low value (per weight) of staples. Moreover, surpluses ($\theta - I$) are generally low – or even zero – for staples because of a low potential for quality upgrading and upgrading through processing. Staple food crops are mostly consumed in the home markets of countries in SSA (rather than being exported) where quality standards are typically lacking and where staples are usually acquired by consumers in unprocessed form to be processed at home.

In addition, there are typically a high number of potential buyers in staple food markets, which increases the likelihood of opportunistic sales and impedes the occurrence of interlinking. Many farm households are involved in staple food marketing, in addition to many, often very small, traders (Govereh et al., 1999). As the need for processing is low, staple foods are easy to trade and it is easy for producers to find alternative buyers offering the same or higher prices, as long as the region is not geographically isolated from the market or the state is not ruling out alternative marketing channels.

Furthermore, staple foods such as grains are roughly homogeneous goods, relatively easy to store and transport with minimal investments, and not highly perishable; which further increases the likelihood of opportunistic sales.

In combination, these factors impede interlinking and make accessing inputs and creating surplus difficult in staple food chains. Opportunistic sales are relatively easy and the value is too low to sustain interlinked contracts through self-enforcement. Contract enforcement is only possible where market power can be established and alternative marketing channels ruled out, for example, through geographic isolation or through state intervention. This, however, has often proved to be detrimental for equity in surplus distribution, and very low producer prices.

Traditional Export Commodities

Traditional export commodities (for example, coffee, cocoa, cotton) have an intermediate value and quality premiums typically exist for these commodities (for example, higher-priced speciality coffees). Moreover, these export commodities are often processed industrially, which reduces the number of buyers in the market, thereby simplifying contract enforcement and facilitating interlinking. However, a relatively large number of processing companies may exist that compete for primary produce such as green coffee and cocoa beans. Farmers might therefore still have opportunities to find alternative buyers, leading to side-selling and hold-ups. Also the bulkiness of the products and the ease of storage and transport may facilitate opportunistic sales.

The likelihood of sustained interlinking and contracting depends on the structure of the market and fluctuations in the demand for the commodity. Contract failure may result where there are many buyers, strongly competing with one another, and in commodities which are relatively easy to store and to transport. In other cases, contracting may turn out to be perfectly viable.

Non-traditional Export Crops

In the case of non-traditional exports (for example, fresh fruits and vegetables), the value of produce is relatively high and high standards exist in overseas markets where consumers are willing to pay for quality. Yet, input requirements are typically high for reaching high quality. The high value, the possibility for quality upgrading, and the need for specific inputs increase the likelihood of interlinking in the non-traditional export sector.

In addition, contract enforcement is easier because of a limited number of buyers and because produce is usually not traded in bulk. Non-traditional export sectors generally include only a limited number of buyers as these sectors are relatively new with less developed marketing channels and often dominated by large multinational food companies. Local consumers do not compete for these types of high-value products as they are generally not prepared to pay high prices for quality. As a result, there is usually only modest competition for these high-value commodities.

Finally, contract enforcement is also facilitated by the perishable nature of the products. Products usually require carefully designed cold chains for transport in order to avoid post-harvest damage and losses, and the time between harvesting and marketing is restricted. Farmers simply do not have enough time to seek more profitable opportunities.

6 POLICY IMPLICATIONS

For the staple food crop sector in SSA to contribute to economic growth and poverty alleviation, it is crucial to realize surpluses in this sector and for those surpluses to be distributed equitably. We have shown theoretically that supply chain development with private governance and interlinking is crucial in this. Several policy options to ensure that such supply chain development takes place follow from our findings.

First, supply chain governance is likely to develop if the value of staple food crops could be increased. However, in many countries in SSA, poor households are both producers and consumers of staple food crops. As increasing staple food crop value unavoidably means increasing consumer prices, this may not be a valid policy option in these poor countries from a food security and poverty perspective.

Second, our model shows that enforcement institutions are crucial for private governance systems with interlinking and equitable surplus distribution to emerge, and to be sustainable. Several authors (for example, Dorward et al., 1998; Poulton et al., 2006) recommend government interventions to directly support interlinked arrangements in the staple food crops sector by shaping the right institutional environment. However, the development of a good institutional environment with strong contract enforcement mechanisms might be very costly in the case of staple food crops. A large number of buyers in the sector, and hence a high degree of competition, might complicate contract enforcement. Moreover, such institutional developments might be particularly hard in remote areas where many staple food crops are produced. Therefore costly policies specifically targeted at improving the contract enforcement environment should be carefully weighed against more general policy priorities, addressing the fundamental problem of factor market constraints.

In fact, attention to the imperfections in input markets is probably the broadest policy option that follows from our findings. If imperfections in input markets could be reduced, supply chains for staple food crops could more easily develop without the need for interlinked contracts. Specific policy recommendations include the implementation of rural credit schemes, attention to input markets, the development of extension services, and the improvement of rural transport and infrastructure.

An important consideration in this discussion is that there might be spillover effects from contract enforcement and the development of sustainable private interlinking in the cash crop sector, which is less costly mainly due to the higher value in this sector. These spillover effects might be direct or indirect. Households engaging in cash crop production through interlinked contracts have better access to inputs, credit, extension, management advice and cash earnings which might indirectly benefit their food crop productivity due to technology spillovers, better skills and better access to cash. In some cases cash crop production under interlinked contracts directly benefits a household's food crops as the contracts provide specific inputs for food crops as part of the enforcement mechanisms. Hence, shaping the institutional environment for cash crop supply chain development might indirectly benefit the staple food crop sector.

Finally, privatization and liberalization induce competition in agricultural markets and hence increase the likelihood of supply chain development with interlinking and equitable surplus distribution. In several countries in SSA, government interventions (and especially the lack of transparency and consistency thereof) impede private supply chains from developing, and are therefore a considerable constraint on the positive implications of these developments.

NOTES

1. We thank Alexander Sarris for many discussions and encouragement in pursuing this research project and the seminar participants for useful comments on the chapter.
2. These authors draw heavily on the work of Diao et al. (2003).
3. Another form of supply chain governance is that of complete vertical integration, which occurs when activities at different stages of the chain are coordinated completely through ownership integration. This is an extreme form of governance that excludes smallholders from the production stage of the supply chain. The first typically occurs when produce is traded on a spot market basis with zero degree of coordination. The latter involves vertical coordination, which can take various forms and usually involves some form of contracting between traders (buyers) and farmers (suppliers). Contracts usually specify some form of price and outlet *ex ante* (sometimes referred to as 'marketing contracts'). In

addition contracts can include inputs, credit and extension services provided by the contractor, detailed production practices stipulated by the contractor, management decisions taken by the contractor and so on (sometimes referred to as 'production contracts').

4. The phenomenon of 'interlinking markets' was first used in the development economics literature to describe a landlord–tenant relation where the landlord acts as a financial intermediary between the outside loan market and his tenants. The landlord has better access to credit than his tenants while he can enforce credit repayment from his tenants through this dominant position in the land market (Bardhan and Udry, 1999).
5. Bell (1988, p. 797) provides the following definition of interlinking: 'an interlinked transaction is one in which the two parties trade in at least two markets on the condition that the terms of all such trades are jointly determined'.
6. This was the case 25 years ago in many low-income countries, not only in Africa. State control was most extreme in the Communist world, spreading from Central Asia to East Europe, but also in many Latin-American and South Asian countries the state played a very important role in the food chain.
7. A number of factors contribute in explaining the increase in non-traditional high-value exports. First, trade and investment liberalization and the change towards export-orientated trade policies have played a role in stimulating developing countries to exploit their comparative advantages in the agri-food sector and encouraging non-traditional high-value exports. Second, market conditions have also played a role in the shift to non-traditional exports. Traditional tropical products such as coffee, cocoa and tea became less attractive because of persistent volatility and long-term downward trends in world market prices for these products (Gulati et al., 2005). Third, the increase in non-traditional exports is induced by changing preferences of consumers in high-income countries stemming from health awareness, increasing income levels, and an increased demand for convenience prepared food (Diop and Jaffee, 2005). Moreover, consumer interest in product variety and year-round availability of fresh food has stimulated non-traditional exports from developing countries.
8. Implying that the application of any amount of inputs below the optimal amount of inputs *I* results in a lack of marketable surplus.
9 This 'equal split' assumption was first suggested by Nash (1953) and later widely adopted by other game theorists (for example, Diamond and Maskin, 1979; Osborne and Rubinstein (1990); Muthoo (1999); and so on.
10 Now, remember that the minimum surplus share that is required to prevent the farmer from input diversion equals $I - \varphi^s$. Hence, if $\varphi^s = \varphi^p = 0$, inefficient separation will occur over the whole domain of θ.
11. A formal analysis is provided in Swinnen and Vandeplas (2007).

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5. Liberalizing trade under structural constraints in developing countries: a general equilibrium analysis of Tanzania

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1 INTRODUCTION

The purpose of this chapter is to explore trade liberalization in the context of structural features that are endemic in low-income agriculture-dependent economies. In most developing countries, major policy changes such as trade liberalization take place against a background characterized by significant structural constraints, which affect the functioning of markets and their degree of completeness and competitiveness. Common characteristics of such contexts are backward technologies and poor infrastructural endowments, contributing to significant market weaknesses. Where subsistence farming is widespread, a significant portion of households' consumption flows directly from production into self-consumption, bypassing specialized processing and distribution systems. Food processing and marketing usually show high transaction costs arising from poor infrastructures, such as inadequate physical transport facilities, and by institutional and physical gaps in the organization of activities.

The structural features of major concern in this chapter are the large marketing margins for agricultural products and the functioning of labour markets. The extent to which the labour market is characterized by rigidities – such as those limiting changes in wages and/or in employment – can shape the social implications of a policy change, in terms of welfare of the different social groups in the country. Trade liberalization is a particularly sensitive policy issue, and it has been shown analytically that its potential impacts are deeply affected by assumptions concerning the structure of the labour market (Ackerman, 2005; Taylor and von Arnim, 2006).

Most analyses of global and national trade liberalization, including those pertaining to agriculture, have not analysed the impact of the existence or reductions in margins between producers and consumers, caused by inadequate infrastructure, such as transport costs, as well as transaction costs due to market regulations. Furthermore, many analyses assume perfect price transmission between world prices and domestic market prices, hence missing one of the most important aspects of underdevelopment and rural poverty, especially in Africa. For instance, a recent analysis in Madagascar suggests that the existence of high transaction costs, such as high transport margins between remote and central regions are associated with lower input use, reduced yields and (consequently) higher incidence of poverty (Stifel et al., 2003). Minot (2005) comes to similar conclusions for Tanzania. Similarly, studies by Delgado et al. (2003) and Kilima (2006) independently find that international and local markets in Tanzania are not well connected, rendering many staple food products essentially non-tradable. This suggests that the existence of large marketing margins can have strong effects on any trade policy changes.

Some recent studies have attempted to include marketing margins in analyses of economy-wide impacts of trade liberalization and other policies. Arndt et al. (2000) found in their analysis of Mozambique that not only are the macroeconomic effects of reducing marketing margins significant, but also there are synergies between simultaneously increasing agricultural productivity and reducing marketing margins. They did not, however, analyse impacts of trade policies. Wobst (2003) explicitly included marketing costs in his analysis of the impact of trade liberalization in five countries in Southern Africa, using computable general equilibrium (CGE) models. He found that reductions in marketing costs improve considerably the export performance, but did not analyse poverty impacts.

This chapter discusses trade liberalization with reference to one specific country in Eastern Africa, Tanzania, and examines the effects of this policy in connection with changes in the marketing margins. The analysis is based on a 2001 social accounting matrix (SAM) for Tanzania, built from data provided by the International Food Policy Research Institute (IFPRI) (Thurlow and Wobst, 2003), which includes considerable factor, household and sectoral details. The simulations presented are run with a CGE model under a wide set of assumptions on the way in which adjustment takes place in the economy.

The chapter proceeds in the next section to discuss the Tanzanian context and the structural features of the economy, while Section 3 describes the main features of the CGE model employed in the simulations. Section 4 reports the results of the simulations, while the following section describes the outcome of the sensitivity analysis performed on the key parameters of the model. Finally, the last section concludes.

2 THE TANZANIAN CONTEXT

Tanzania is among the world's poorest countries, with a per capita income of about US$280. During most of its post-independence history, the country experienced extended periods of below-potential economic performance. From the mid-1980s, Tanzania embarked on economic reforms which were not sustained, and after an initial period of economic growth in the late 1980s, the early 1990s were again characterized by macroeconomic disequilibrium and poor economic growth.

By the 1990s the country resumed its reform course with a clear and sustained commitment to macroeconomic stability through sound fiscal and monetary policies. Stabilization was accompanied by wide-ranging structural reforms, including privatization of state-owned enterprises, liberalization of the agricultural sector, efforts to improve the business environment, and strengthening of public expenditure management. Such reforms have resulted in sustained growth, which in the last few years has been 5 per cent.

Agriculture plays a dominant role in the economy, accounting for nearly 45 per cent of GDP, for about three-quarters of merchandise exports, employing around 70 per cent of the labour force, and constituting a source of livelihood for about 80 per cent of the population, particularly for the poorer and more vulnerable groups in rural areas. Poor rural households tend to market small shares of their produce, and use most of it for their subsistence.

Smallholder farmers characterize Tanzanian agriculture. The average farm size varies between less than 1 and 3 hectares, and the vast majority of the crop area is cultivated by hand. The main food crops are maize, rice, wheat, sorghum/millet, cassava and beans, occupying nearly 85 per cent of the arable land. Bananas are grown mainly in the Kagera and Kilimanjaro areas; like cassava, these crops have a low value-to-bulk ratio, and are generally retained for direct consumption.

Export crops represent 12 per cent of the value of total crop production. From the early 1990s, state participation and control over marketing and input supply has been gradually reduced.

Earlier studies (Government of the United Republic of Tanzania, World Bank and IFPRI, 2000) indicated that the country enjoys a comparative advantage in all of its major export crops and in several of the main food crops, despite the low levels of technology. These studies also highlighted the presence of significant linkages between the production of exportable agricultural goods and rural incomes and growth. Agricultural development and increased productivity are therefore crucial for both economic growth and poverty alleviation.

Poverty levels are high in Tanzania. During the past decade, a reduction has occurred mainly in urban poverty, while rural areas have seen relatively little change. The aggregate poverty level in 2000–01 was 36 per cent compared to 39 per cent in 1991–92, but in rural areas about 40 per cent of households were reported to be below the basic needs line, accounting for about 81 per cent of all the poor population. In 1991–92, the poverty level of this same type of household – depending on agriculture for their livelihood – was 42 per cent. These figures are not surprising, given that the agricultural sector only expanded at 3.5 per cent per year over the past decade, corresponding to less than 1 per cent in per capita terms; they suggest that agricultural development and better farm-gate prices can potentially result in significant poverty reductions.

A recent study by Levin and Mbamba (2004) showed that an expansion of agricultural production in Tanzania has the strongest potential effects in terms of employment and income generation; it would, however, benefit mostly the non-poor households, both in rural and urban areas. Despite such asymmetry, the growth of agricultural production still seems to imply the largest potential impact on poverty reduction. Furthermore, by selectively increasing total factor productivity (TFP) in agricultural production, the study shows that the best growth prospects were offered by exportable crops, as these could lead to larger exportable surpluses. On the contrary, TFP increases in food crops would depress income growth, as food crops are mostly non-tradable, and hence a production expansion, combined with a slowdown of domestic demand, would reduce prices, negatively affecting the poor rural households.

3 THE CGE MODEL FOR TANZANIA AND DATA UTILIZED

The simulations presented in this chapter are based on a single-country CGE model which was built as a modified version of the one presented in Lofgren et al. (2002). The framework is comparative static and assumes profit maximization on the supply side, and utility maximization on the demand side. On the supply side, the model utilizes a constant elasticity of substitution (CES) function to determine the level of each activity from aggregate value added and aggregate intermediate inputs. Individual intermediate inputs are determined by fixed coefficients in relation to the aggregate intermediate inputs. Aggregate value added for each activity is defined as a CES function of factor inputs. Activities produce outputs of individual commodities, which are allocated to domestic and export uses via a constant elasticity of transformation (CET) function. Imports are assumed to be imperfect substitutes for domestic output, following the approach proposed by Armington (1969). Therefore, commodities available in the domestic market are modelled as composite goods, made up of domestic and imported differentiated products. Non-land capital – both in agriculture and in other activities – is assumed to be fixed in each sector at the base-year level. Total arable land is assumed to be fixed, but substitution is allowed among agricultural activities, in the light of price changes.

On the demand side, the model distinguishes between home self-consumption, which flows directly from the activities to the households without including transaction costs, and marketed consumption, in which households purchase composite commodities which do include transaction costs and indirect taxes. Two separate demand systems are included for home and marketed goods, each modelled as a linear expenditure system (LES). One investment good produces demands for the products of various sectors via fixed capital coefficients. Total investment demand is defined as an adjustment coefficient multiplied by the volume of total real investment – in the base period. This adjustment factor can be specified as either endogenous or exogenous depending on the closure rule.

The model explicitly includes a domestic trade sector, which collects the transaction costs associated with all marketed activities, and distinguishes three separate components of transaction costs, namely those involved in exporting goods, those for importing goods, and those required for selling into the domestic market. These margins enter the price formation equations as exogenous transaction cost coefficients.

A representation of the public sector is included in the model, in which revenues accruing from value-added, income, import and export taxes are balanced against public demand for government consumption and investment. The public demand for commodities is determined by the demand for the product of a sector called public administration. Equilibrium conditions ensure clearance in the factor and the commodity markets.

Welfare is measured in terms of 'money metric utility' (MMU) (Deaton, 1980), namely by comparing the expenditure of a household under a simulated scenario, where the household has expenditure Y, and pays prices p, with the expenditure that the household would have to incur to obtain the same level of welfare as in the base period (denoted by 0) but assuming it had to pay the current prices p.

In any economy-wide CGE model one must specify how equilibrium is achieved (the closure rule) by designating certain aggregate variables as endogenous or exogenous variables. This notoriously contentious matter is well beyond the scope of this chapter, but cannot be avoided in fact, as any simulation implies crucial assumptions on the adjustment mechanisms in the economy.[2]

Based on empirical evidence and knowledge of the Tanzanian economy, the closure rule was defined as follows. Commodity markets are assumed to clear so that all prices adjust to make supplies equal demands. This is a standard assumption in most CGE models, and is appropriate in the context of a low-income economy such as Tanzania, in a post-adjustment phase, where there are no essential price controls on most products. Concerning factor markets, however, we depart from the standard approach, as it is well known, and Tanzania is no exception, that most low-income countries have excess of unskilled labour and shortage of skilled labour. This suggests that skilled labour wages are more responsive to changes in supply and demand, while unskilled wages are less so. The wages of all unskilled labour classes are therefore assumed to be fixed in real terms, while wages of skilled labour classes are flexible and respond to supply and demand.

Concerning the behaviour of investment we adopt the classical view that investment is determined by available savings, as we believe that savings, especially private savings are a major constraint to investment in an economy such as Tanzania. Concerning the foreign sector, we assume that the exchange rate is flexible, while the availability of foreign savings (namely foreign loans and grants) is fixed. This seems to fit well with the post-adjustment period in Tanzania. Finally, we assume that the government budget is endogenously determined. In other words we assume that the government does not have the short-term ability to change taxes and other fiscal instruments to keep the public deficit at a fixed level.

While we use this closure rule in the simulations, we also examined the sensitivity of the results to such a rule, and particularly the implications of trade liberalization under a different set of structural and economic adjustment conditions.

The simulations are based on the most recent social accounting for Tanzania, provided by IFPRI, which refers to 2001 (Thurlow and Wobst, 2003). The original SAM was aggregated to include 24 different activities and commodities, of which nine are crops, two are primary livestock activities, four are processed food and beverages, four are secondary sector activities, and five are services, including trade and administration.[3]

In the factor market, the SAM includes six types of labour, four of which can be considered as unskilled,[4] plus agricultural and non-agricultural capital, and land, which is employed only in agriculture. Concerning institutions, the private sector is represented by an aggregate enterprise entity, and by six types of household, three urban and three rural,[5] plus the government sector. The SAM reports direct taxes, various types of indirect taxes, such as taxes on value added, taxes on factor use, imports tariffs and export subsidies.

A comparison with microeconomic evidence from independent surveys conducted in Tanzania (Sarris et al., 2006) showed that the original SAM provided by Thurlow and Wobst (2003) includes a low level of marketing margins for the domestic market, as well as for exports and imports, particularly for agricultural and food products. This arises from the types of margins considered in that SAM, which considers as marketing cost only wholesale to retail margins but not farmer to wholesale margins, the latter being much larger than the former. Therefore, the SAM was modified accordingly. Given the absence of systematic information on transaction costs, it was decided to re-compute these as percentages of the values of the marketed as well as of the exported and imported commodities. The difference in the resulting income in the SAM was subtracted from the income of the respective producers, with the result that the whole SAM had to be rebalanced. For exported commodities it was assumed that the margin associated with transaction costs would amount to 50 per cent of the marketed values. For imports the same margin was set at 20 per cent of import values, and for domestic sales to households at 30 per cent of purchased values.[6]

Table 5.1 exhibits a summary of the structural characteristics of the Tanzanian economy in 2001 as inferred from the (rebalanced) SAM. It can be seen that maize and cereals are large sectors as far as GDP is concerned but not large as far as trade is concerned. While agricultural exports are significant, the most important exportable sector is transport. The most important imported sector is that of secondary products. Among the export-producing sectors, coffee and cashew are almost totally dependent on exports, while significant export propensity is exhibited by other cash crops and transport. There are large shares of most agricultural products that are not marketed. Despite the limited importance in total imports of maize and cereals, their imports constitute a significant share of total consumption of these products. Finally the last column exhibits the domestic marketing margins as ratios to the marketed sales of the respective sectors after the rebalancing of the SAM.

4 IMPACTS OF POLICY CHANGES AND THE IMPORTANCE OF STRUCTURAL CONSTRAINTS

In this section we analyse the impact of trade liberalization relative to structural changes or exogenous shocks. Particularly, the following scenarios have been analysed:

Table 5.1 Production and trade structure of the Tanzanian economy in 2001

Activities, Commodities	Share in total value added (%)	Share in total exports (%)	Share in total imports (%)	Share of exports in production (%)	Share of marketed production in total production (%)	Share of imports in total domestic consumption (%)	Ratio of domestic margin to marketed production (%)
Maize	9.9	0.1	0.8	0.2	48.2	3.6	13.3
Other cereals	5.6	0.2	2.0	0.5	76.7	7.7	4.2
Beans	2.3	0.1	0.0	0.6	73.6	0.0	25.6
Other cash crops	4.6	10.2	2.5	22.1	93.3	8.8	7.3
Cassava and roots	3.6	0.0	0.0	0.0	40.2	0.0	31.4
Coffee	0.8	7.3	0.0	92.7	96.0	0.0	1.1
Cashew	1.0	7.2	0.0	98.6	100.0	0.0	0.0
Other fruits and vegetables	6.6	2.1	0.4	6.9	65.9	2.0	31.8
Other crops	0.8	0.3	0.0	9.5	58.6	0.3	25.8
Livestock	3.3	0.5	0.1	2.4	83.7	1.1	13.7
Fishing and hunting	7.7	5.4	0.0	13.3	77.5	0.1	28.6
Mining	1.5	1.5	0.7	12.7	100.0	9.0	4.2
Meats	2.3	0.0	0.2	0.2	75.1	1.5	40.8
Processed grains	0.7	0.5	0.8	1.0	100.0	2.3	33.1
Other processed foods	2.0	0.5	3.7	1.3	97.3	14.8	44.0
Beverages	0.9	0.1	0.8	0.5	95.9	8.2	38.6
Other secondary activities	6.2	3.3	62.7	1.6	100.0	52.9	3.0
Utilities	1.7	0.0	0.0	0.0	100.0	0.0	0.0
Construction activities	4.5	0.0	0.1	0.0	100.0	0.3	0.0
Trade	10.5	0.0	0.0	0.0	100.0	0.0	0.0
Hotels	2.6	0.0	0.0	0.0	100.0	0.0	0.0
Transport	5.8	44.3	19.5	53.7	100.0	36.4	0.0
Other services	9.0	10.9	4.7	7.4	74.9	4.9	0.0
Public administration	6.2	5.5	0.9	4.4	100.0	1.1	0.0

Source: Computed by authors.

1. MARG DECR: an exogenous 10 per cent decrease in the marketing margins, designed to explore the impacts of investing in marketing infrastructure;
2. TARCUT: a 50 per cent cut in all import tariffs;
3. EXP PR INCR: a 10 per cent increase in export crop prices;
4. IMP PR INCR: a 10 per cent increase in the import prices of food and agricultural imports;
5. IMP EXP PR INCR: a 10 per cent increase in export crop prices combined with a 10 per cent increase in the import prices of food and agricultural imports; and
6. MULT TRADE LIB: the price increases implied in scenario 5 and in addition the tariff cuts implied in scenario 2. This is a scenario that may be expected from a multilateral trade liberalization, albeit the numbers are quite arbitrary and only indicative.

Table 5.2 reports the results of these experiments for a set of macro variables including the aggregate real GDP at factor cost; agricultural and total imports and exports, aggregate investment, employment of unskilled and skilled labour, and the exchange rate. Table 5.3 reports the results for the welfare of the six types of household.

In the first scenario (MARG DECR), the 10 per cent decline in the marketing margins raises producer prices of agricultural commodities, including those of the exportable crops, whose production expands, inducing significant increases in exports. Given the assumption of variable employment in the unskilled workforce, the increased prices imply additional agricultural production and income. Part of this flows into home consumption, but also demand for domestic products, and replaces a part of agricultural imports, while increasing imports (and consumption) of non-agricultural and hence more income-sensitive goods. This happens notwithstanding the depreciation of the exchange rate, which boosts the production of import-competing goods, particularly manufactures in this case. In turn, the positive effects on both production and consumption explain the good performances of GDP and investment. The latter is helped by larger government revenues from tariffs on increased imports. The aggregate employment of unskilled labour increases considerably, and this is the factor that boosts GDP. Considering household welfare (Table 5.3), this scenario implies significant and quite generalized improvements in welfare of all types of household, and this is the result of increased demand for unskilled labour.

Under a 50 per cent reduction in all tariffs (TARCUT) the level of government savings is significantly reduced, by almost 50 per cent as a consequence of the reduced revenues, and this has detrimental effects on

Table 5.2 Aggregate results of simulation experiments

Experiments	GDP	Agricultural import	Total imports	Agricultural export	Total exports	Aggregate investment	Government savings	Unskilled labour	Exchange rate
BASE	7.80	247.86	2093.46	225.72	1078.05	1.00	92.49	2.46	1.00
MARG DECR	3.71	−1.58	6.88	31.38	6.30	0.66	16.2	12.78	3.96
TARCUT	0.41	8.69	0.79	0.70	1.21	−2.65	−49.4	1.32	1.66
EXP PR INCR	0.40	7.27	1.49	1.44	−1.41	0.95	−1.15	1.35	−4.72
IMP PR INCR	0.31	−10.76	−1.13	−0.76	−0.11	0.16	1.99	0.99	−0.49
IMP EXP PR INCR	0.71	−4.00	0.29	0.76	−1.50	1.11	0.89	2.36	−5.18
MULT TRADE LIB	1.09	1.49	1.03	1.56	−0.32	−1.50	−46.7	3.65	−3.63

Source: Authors' calculations.

Table 5.3 Welfare results of simulation experiments (percentage change from base)

	Rural poor	Rural non-poor uneduc.	Rural non-poor, educ.	Urban poor	Urban non-poor, uneduc.	Urban non-poor, educ.
MARG DECR	5.07	3.69	7.43	9.35	7.86	7.03
TARCUT	−0.09	−0.16	1.47	2.23	1.72	1.36
EXP PR INCR	0.41	0.16	1.31	2.32	1.52	0.93
IMP PR INCR	0.06	−0.10	0.10	0.16	0.12	−0.06
IMP EXP PR INCR	0.46	0.06	1.40	2.48	1.63	0.86
MULT TRADE LIB	0.35	−0.12	2.82	4.65	3.30	2.17

Source: Authors' calculations.

aggregate investment. As expected, imports and exports increase, despite a 1.7 per cent depreciation of the exchange rate, the latter accounting for the good performance of exports. At the same time, the smaller demand for domestic goods leads to a lower level of investment. However, GDP still grows, although by a small amount, as a consequence of the small increased level of employment of the unskilled workforce. In terms of welfare (Table 5.3) the scenario shows mixed results. Net gainers are the urban poor and the less-educated households, together with the better-off rural households. The increased employment of the unskilled workforce explains the result for the urban poor households, while the improved position of the rural more-educated households stems from the increased exports, which are mostly of agricultural cash crops such as coffee and cashew. However, it appears that one of the fears of trade liberalization is realized, namely unequal benefits for households, and especially reductions in welfare of the rural poor.

Scenario EXP PR INCR involves increases by 10 per cent in the prices of the four sectors that produce the bulk of Tanzanian agricultural exports, namely coffee, cashew nuts, other cash crops such as cotton, and oilseeds, and fishing and hunting. The simulation produces a small increase in GDP (Table 5.2) together with a significant exchange rate appreciation, as expected under a fixed foreign exchange availability constraint. Agricultural exports increase only slightly, and total exports decrease due to the restructuring of the export-producing sectors, while total imports increase to keep foreign savings constant. Total investment increases marginally under this scenario, and public savings deteriorate slightly, following a production shift towards export crops, which are less taxed. Thus, the small increase in total investment comes about because of an increase in private rather than public savings. In terms of welfare (Table 5.3) this scenario, like the previous one, implies a generalized improvement, which is particularly significant for the better-off households, both urban and rural.

Scenario IMP PRINCR simulates a 10 per cent increase in the world prices of the main imported agricultural and food products, namely other cereals, other crops, processed grains, beverages, and other food. This scenario also leads to a slight GDP expansion, to a minor appreciation of the exchange rate, to a significant decrease of agricultural imports, and to a decrease in total imports, as well as in agricultural and total exports. Total investment appears to increase marginally, as do public savings. On the welfare front (Table 5.3), this scenario favours the urban poor and uneducated households, together with the better-off rural ones. However, in general there does not appear to be much negative impact from world price increases of food and agricultural imports, due also to the smaller share of imports in the major staple foods. This conclusion bodes well for the impact on Tanzania from a multilateral trade liberalization that may increase world prices of food and agricultural products.

The scenario IMP EXP PR INCR, which combines the previous two, is meant to resemble – in optimistic terms – the outcome of a multilateral trade liberalization, leading to some kind of widespread increase in world prices. The results appear to induce growth in employment, investment and welfare (Tables 5.2 and 5.3). A modest GDP growth arises together with minor changes in the trade pattern, whereas a more significant change appears in the level of unskilled labour. Welfare increases in all rural households, as well as in the poorer urban group, largely as a result of the increased employment in the lower labour market segments. The policy implication of the scenario is simple: increased world market prices without obligations to cut its own tariffs would produce considerable expansion in Tanzanian agriculture; and such expansion would be pro-poor, as confirmed also by the analyses reviewed in Section 3.

The final scenario (MULT TRADE LIB) combines the previous one with the tariff cuts of the TARCUT scenario. It exhibits stronger GDP growth than any of the other trade-related scenarios and larger increases in agricultural imports. However, it implies significant reductions in aggregate investment due to the large reduction in public savings. In terms of welfare, it is still the case that the rural poor and uneducated are very little or negatively affected, implying that a multilateral type of trade liberalization will have rather adverse distributional impacts.

The scenario that yielded the more significant results in terms of the macro variables as well as welfare improvements is the one in which marketing margins are reduced. This appears to dominate by significant amounts the different trade policy scenarios, and suggests that gains from infrastructure and transaction cost-reducing interventions can have more important growth and pro-poor impacts. This implies that the aid for trade initiative that is supposed to, among other things, help reduce transaction costs and improve tradable infrastructure is probably more important and should be given priority over trade liberalization in developing and especially least-developed countries.

5 SENSITIVITY ANALYSIS

The sensitivity of the results presented above was analysed in several ways. Concerning marketing margins, as mentioned these were increased in the base SAM compared to the original SAM supplied by IFPRI, on the basis of additional micro-level information on the difference between farm-gate and wholesale prices. The same policy scenarios presented above in the last section were also run on the original dataset supplied by IFPRI. It is worth underlining that the relative strength of the effect of a reduction in the marketing margins compared to that of the tariff cut proved to be robust to the change in the initial size of the margins. We believe that this is an important check, which rules out the possibility that the economy-wide effect of a reduction in the margins arises only from their size, which we overstated compared to the original dataset supplied by IFPRI.

Concerning the closure rules, the experiments presented in the previous section were run with 17 closures, resulting from different combinations of assumptions about the functioning of the labour market, the external sector, about the behaviour of investment and the public budget. Specifically, concerning the labour market, the model was run with different combinations of fixed and flexible wages assumptions for unskilled and skilled labour, and for both these types of labour. As regards investment, its level was assumed to be fixed at a predetermined level, with savings adjusting to that level. As for the external sector, the model was tested under the assumption of fixed exchange rate, implying variable foreign savings. Finally, we tested the assumption of neutrality of the public budget, implying endogenous adjustment of the tax rates.

The closure rules make a considerable difference to the simulation results, for key variables such as household welfare, GDP and trade. The assumptions concerning the labour market, particularly, appear to affect considerably the outcomes in terms of GDP; whereas those concerning the exchange rate tend to affect more directly the results of the scenarios concerning trade changes. There are, however, some key results that seem to hold across the different closure rules, particularly the relative effects of a reduction in marketing margins reduction *vis-à-vis* tariff reductions. This evidence turned out to be fairly robust to changes in the closure assumptions.

Concerning the parameters, the major unknown parts in CGE models of this type, which are calibrated to a base dataset, are the substitution and transformation elasticities, particularly those governing the substitution in consumption between domestically produced and imported commodities, the substitution in production between domestic and exportable products, and the substitution among the factors in the production across the activities. Such parameters determine the extent to which substitutions occur within the economy, and they are expected to be larger the longer the time horizon assumed as underlying the simulations. As it is not easy to pinpoint the type and extent of adjustment that is possible in an economy, in order to explore the sensitivity of the results to the parameter employed we repeated all the experiments indicated earlier with Armington elasticities of substitution between domestic and imported commodities set at 50 per cent above and below their original values, with all the other parameters unchanged. We also varied similarly the elasticities of transformation in production between domestic and exported commodities, and the elasticities of substitution between factors in the production in the various activities.

Due to space limitations, we do not report the results of the sensitivity analyses just described; however, these are available from the authors upon request. In general, the results do not exhibit significant changes compared to the results obtained with the base parameter values.

6 CONCLUDING REMARKS

The key result of the chapter is that the highest poverty reduction under all closure rules is the one in which marketing margins are decreased. This implies that all households, but particularly the rural poor could gain substantially from a change in this area. While the exact size of GDP growth and of the welfare improvements depend upon the closure rule adopted, there appears to be little doubt that a reduction in marketing margins would be an efficient investment policy choice for Tanzania.

By contrast, none of the scenarios assuming significant further trade liberalization seems to produce significant GDP changes, nor do they produce any significant changes in household welfare, even when large degrees of liberalization are assumed. If anything, tariff cuts produce a large decline in public revenues, which in turn affects negatively total available savings in the economy and hence the volume of real investment. We should conclude, therefore, that trade liberalization does not appear to be a panacea for growth and poverty alleviation, at least in Tanzania.

The sensitivity analysis highlighted the fact that assumptions about the way the economy adjusts affect the outcome of trade liberalization as well as all other external and policy changes. This applies particularly to the functioning of the labour market. While microeconomic considerations for Tanzania support the fix-price mode of labour adjustment, more analysis and research is required in this area. Any empirical analysis using CGE models, whether national or global, should devote considerable effort to understanding and incorporating in the model structure the nature of the different closure rules that seem prevalent in different types of economies, as they may make a considerable difference to the results obtained.

NOTES

1. The authors gratefully acknowledge support from Peter Wobst who kindly provided helpful comments as well as data and parameters relevant to the model implemented here.
2. See Rattso (1982), Taylor (1990) and Robinson (1991) for extensive reviews on this topic.
3. The complete list of activities/commodities includes: maize, other cereals, beans, other cash crops, cassava and roots, coffee, cashew, other fruits and vegetables, other crops, livestock, fishing and hunting, mining, meats, processed grains, other processed foods, beverages, other secondary activities, construction activities, utilities, trade, hotels, transport, other services, and public administration.
4. The complete list of labour types includes: subsistence labour, child labour, non-educated male labour, non-educated female labour – which altogether form the unskilled group – plus educated male labour and educated female labour.
5. The complete list of households includes, for both the rural and the urban sectors, poor, non-poor–non-educated, and non-poor–educated, distinguished on the basis of the status of the reference person in the household.
6. In order to avoid losing useful information in the rebalancing process, it was decided, first, that the more reliable data would be maintained at their original level in the rebalancing. In this respect, the choice was to maintain data on foreign trade and all public sector transactions at their original level; and second, the rebalancing was implemented with different methods, in order to choose the output that would yield the smaller and more widespread changes in the original figures. The best performance was achieved by minimizing the sum of the squared residuals of the changes in the SAM elements.

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6. Grain marketing policy at the crossroads: challenges for Eastern and Southern Africa

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1 INTRODUCTION

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

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

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

This chapter identifies major challenges and underlying trends affecting the food sectors in the Eastern and Southern African region. These issues are intended to set the context and parameters for discussions of alternative food marketing and trade policy options. We address the following issues that are likely to fundamentally affect the outcomes and distributional effects of alternative food marketing and trade policies: how historical and political factors constrain the feasible set of agricultural marketing and trade policy options in many countries of the region (Section 2); how chronic underprovision of market-facilitating public goods has exacerbated the current food security policy dilemmas (Section 3); how governments can make the demand for staple food more elastic and hence mitigate the price instability problem (Section 4); the implications of Eastern and Southern Africa's transition towards structural grain deficits (Section 5); how the emerging bio-fuels industry and other world market changes will affect import parity prices (Section 6); why a relatively small proportion of smallholder farmers will be able to benefit from the likely rise in regional food prices (Section 7); the segmentation of formal and informal markets (Section 8); and how the rise of cassava production is likely to affect grain price stability (Section 9). Section 10 concludes.

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

2 HISTORICAL AND POLITICAL FACTORS SHAPING FOOD MARKETING AND TRADE POLICY OPTIONS

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

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

However, the rise of multi-party electoral processes in the early 1990s has made it difficult for governments in these countries to withdraw from the social contract policies. Elections can be won or lost through policy tools to reward some farmers with higher prices and reward others with lower prices, and this is hardly unique to developing countries (Bates, 1981; Bates and Krueger, 1993; Bratton and Mattes, 2003; Sahley et al., 2005). Because they provided obvious demonstrations of support for millions of small farmers and consumers, a retreat from the social contract policies exposed leaders to attack from opposition candidates (Sahley et al., 2005).[4] For this reason, it remains difficult for leaders to publicly embrace grain market and trade liberalization, even as they accepted structural adjustment loans under conditionality agreements from international donors to reform their internal and external markets. And starting in the late 1990s, the transition of the World Bank and other donors from conditionality agreements to direct budget support made it easier for states to reinstate some elements of the social contract policies. By the early 2000s, grain marketing boards have once again become the dominant players in the market in Kenya, Malawi, Zambia and Zimbabwe (Jayne et al., 2002). Each of these countries has a highly unpredictable and discretionary approach to grain trade policy, commonly imposing export and import bans and/or variable import tariffs, or issuing government tenders for the importation of subsidized grain. 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 continued strong government operations in food markets.

3 HISTORICAL UNDERINVESTMENT IN PUBLIC GOODS

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

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

Policy choices also affect transaction costs and risks. A common practice at border crossings is that trucks carrying maize are unloaded on one side of the border, carried across on bicycles one bag at a time, and re-loaded onto trucks on the other side of the border to evade import duties. While contributing very little to public revenue generation, these duties create costs for traders and raise marketing margins which are ultimately borne by farmers and/or consumers. While we are now learning that the magnitude of private cross-border trade is much higher than previously thought (WFP/FEWSNET, 2006), this has occurred in spite of considerable efforts to suppress it, and very little effort to invest in the physical market and communication infrastructure to nurture regional trade. Southern Mozambique is a notable exception to this pattern. Although officials have not promoted cross-border trade, they have permitted it to occur unhindered (Tschirley et al., 2006). This policy stance, plus the country's coastal status has allowed trade to stabilize prices in Maputo compared to other capital cities in the region (Chapoto and Jayne, 2008).

Other public goods investments that can promote the performance of domestic and regional trade are those that raise smallholder productivity, such as improved seed generation and other types of crop science, innovative extension programmes to improve farmers' management practices, and the generation and dissemination of accurate crop production forecasts and price information. Unfortunately, in many countries, crop forecasts are notoriously unreliable. Zambia, for example, has lost its ability to estimate maize production from the large-scale farming sector. This injects a great deal of guesswork into the food balance sheets that the government uses to estimate import requirements and/or export potential, which in turn increases the probability of undershooting or overshooting of trade volumes.

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

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

Unfortunately, some analysis assessing the impacts of alternative policies on outcomes has inadequately distinguished between stated policy pronouncements and actual on-the-ground implementation. In fact, the implementation of food market reform programmes across Africa has been very heterogeneous. The impacts of reform on smallholder production growth and price instability have varied greatly according to how the reforms were designed and implemented. Failure to adequately treat these distinctions in implementation has led to frequent mis-identification of policy impacts, providing misleading information to policy makers, and thus reducing the potential value of empirical research.

Despite the conventional perception that food markets have been 'liberalized', many African governments have continued to intervene heavily in food markets throughout their reform processes (Toye, 1992; Jayne et al., 2002; Harrigan, 2003). These interventions have taken two main forms: (i) marketing board operations, and (ii) discretionary trade policy instruments, such as variable export bans and import tariff rates. A defining feature of the marketing environment in the 'liberalization period' in countries such as Kenya, Malawi, Tanzania, Zambia and Zimbabwe has been the tremendous unpredictability and frequent change of direction in governments' role in the market. In this shifting policy environment, the private sector's response has naturally been muted, especially at the critical wholesaling stage.

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

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

Available evidence since 1990 indicates that governments' attempts to stabilize food prices in some cases made food prices more stable (for example, Kenya, see Jayne et al., 2008) but, more often, more volatile (Nijhoff et al., 2003; Rubey, 2004; Tschirley et al., 2006). The latter cases are exemplified by the government of Malawi's response to an anticipated maize production shortfall in the 2001/02 season. Malawi faced a modest maize production deficit for its 2001 harvest, 8 per cent below the country's 10-year mean. In September 2001, the grain trading parastatal, ADMARC (Agricultural Development and Marketing Cooperation), announced a fixed price for maize to be sold at its distribution centres and announced its intention to import maize from South Africa to defend this price (Rubey, 2004). Because ADMARC's selling price was considerably lower than the landed cost of imported maize, private traders had little incentive to import maize in this environment. However, the government imports arrived late and were not sufficient to meet demand. As a result, ADMARC depots began to experience stock-outs, and prices soared (ibid.). When it became clear that ADMARC's supplies were insufficient to last the full season, private traders scrambled to import, but for several months much of rural Malawi experienced grain shortages and prices were reportedly as high as $450 per tonne in early 2002. The late-to-arrive ADMARC imports arrived during the good 2002 harvest. For financial reasons, ADMARC had to work down its stocks to free up resources, and these releases onto the market in a good production year produced 16 months of continuously declining maize prices, to the detriment of producers' incentives to intensify their maize production (Rubey, 2005; Tschirley et al., 2006). This case illustrates that well-intentioned but poorly implemented government actions can exacerbate food price instability rather than reduce it.

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

Since the early 1990s when the liberalization process began, the marketing boards in Malawi, Kenya, Zambia and Zimbabwe have frequently imported maize in volumes that are large compared to the size of the market, and sold at prices considerably below the cost of commercial importation. The expected return to private storage in this policy environment is considerably lower than what it would be if prices were allowed to fluctuate between import and export parity. This has impeded private investment in storage, particularly at the wholesale level. Because governments often attempt to truncate the distribution of food prices at both the upper and lower ends, stockholding is risky and there are no assurances that normal intra-seasonal price rises will occur due to the uncertainty over government action. Moreover, most of the silo capacity in countries such as Kenya, Malawi and Zambia 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 (Kopicki, 2005). While some analysts point to the large intra-seasonal price variability observed in countries such as Malawi and Zambia as indicators of weak private sector capacity and the limitations of market liberalization, the market environment in most of the region does not provide a meaningful counterfactual to assess the private sector's capacity to engage in inter-seasonal storage.

Thus, two decades after market reform programmes were initiated in Eastern and Southern Africa, maize marketing policies in many countries are fundamentally similar to the controlled marketing systems of their earlier histories. Many governments remain important players in their staple food markets, both through their direct procurement and sale operations and through their use of trade policy instruments. Although the quantities they trade are smaller than during the controlled market era, marketing boards in these countries still exert a dominant presence in the maize markets, handling between 10 to 50 per cent of marketed volumes. Some aspects of policy change have been implemented, primarily the legalization of private trading, and marketing board operations have been downsized, primarily due to fiscal constraints. Instead of purchasing the entire marketed surplus, as was the goal during the former control period, these boards now attempt to influence market prices through their purchase and sale operations, ostensibly for food security and/or price stabilization purposes. Many countries in Eastern and Southern Africa have continued food price stabilization with subsidy programmes of various types, and hence these countries' market performance since the 1990s reflects not the impacts of liberalized markets but rather the mixed policy environment of legalized private trade within the context of highly interventionist government operations in food markets. There is a general consensus that this approach has largely failed to stabilize farm prices, provide adequate seasonal finance for small farmers' purchase of cash inputs, or stimulate private investment in the assembly and wholesaling stages of the value chain, and hence it has been unable to provide smallholders with the incentives to use improved farm technology in a sustainable manner.

Before leaving this section, we present trends in staple cereal production (Table 6.1) for these countries having continued to pursue direct price support and stabilization objectives (Kenya, Malawi, Zambia and Zimbabwe) compared to cereal production trends for Sub-Saharan Africa as a whole, and for three countries that have adopted a comparatively non-interventionist approach to grain markets (Mali, Mozambique and Uganda). One obviously cannot attribute differences in national cereal production performance simply to the manner of government participation in

Table 6.1 Cereal production trends in Kenya, Malawi, Zambia, Zimbabwe and Sub-Saharan Africa overall, 1985–2005

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

Source: FAOSTAT website: http://faostat.fao.org/, accessed October 9, 2007.

food markets. However, the data in Table 6.1 provide prima facie evidence that none of the four countries pursuing food price stabilization and food security objectives through direct state operations over the past decade has been able to match production growth for the continent as a whole. While cereal production in the Sub-Saharan African region as a whole has increased by roughly 60 per cent over the past two decades, three of the four countries continuing to intervene heavily in their food markets are barely achieving cereal production levels of the 1980s. Ironically, these are the countries where the greatest advances in cereal seed technology have been made, and where green revolutions were believed to have been initiated in the 1970s and 1980s. By contrast, Mali, Mozambique and Uganda have all experienced a 90 per cent or greater increase in cereal production over the past two decades, despite having benefited much less from the technological contribution of improved seeds.

4 MAKING THE DEMAND FOR GRAIN MORE ELASTIC

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

If farmers' initial adoption of productivity-enhancing technology causes the food supply curve to shift from S^0 to S^1, prices will drop from P^0 to P^1 if markets are unable to absorb the surplus due to inelastic demand (D^0) (Figure 6.1a). The actual quantity supplied increases marginally from Q^0 to Q^1. In this environment, markets are not able to support sustainable farm technology improvements.

By contrast, Figure 6.1b shows a situation of elastic demand. When demand is elastic, greater quantities of product can be absorbed by the market without depressing prices. If the demand for grain were more elastic, the same expansion of the food supply curve from S^0 to S^1 would

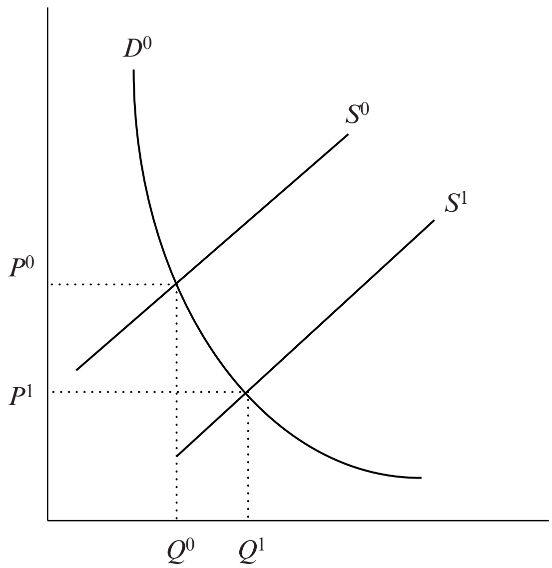


Figure 6.1a Supply expansion with inelastic demand

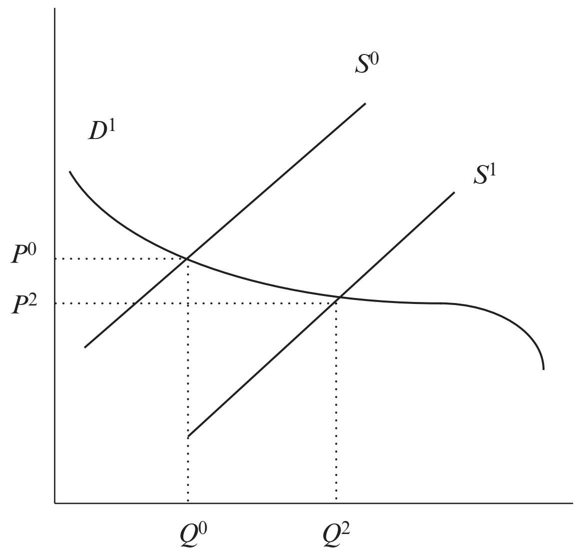


Figure 6.1b Supply expansion with elastic demand

cause a much smaller reduction in farm prices, and a much greater ability to increase actual quantities supplied by farmers (Q^0 to Q^2). A major challenge of output market development, therefore, is to make the demand for staple food much more elastic. A related challenge is how to expand the demand for grain to maintain strong incentives for farmers, but in a way that does not price poor consumers out of the market.

A third scenario, shown in Figure 6.1c, underscores the power of regional and international trade to stabilize food prices and support farm technology adoption. Here the magnitude of potential price fluctuations is truncated by trade possibilities. If a country's markets can be well integrated with surrounding countries, then if prices drop to a certain level (P^3), the country's surplus production will become competitive in regional or international markets, providing a vent for surplus production at a level equal to the price in international markets minus transport costs (P^3). Likewise, if prices rise to a certain point (P^4), surpluses in other countries can be brought into the country at a cost equivalent to the price of grain in the surplus country plus transport costs (P^4). However, the theoretical price stabilizing effects of trade can only be realized in practice if markets work well, which depends on getting the incentives right for traders to operate.

Fortunately, it is possible to alter the shape of the demand curve that small farmers face. The demand for staple grain crops can be made

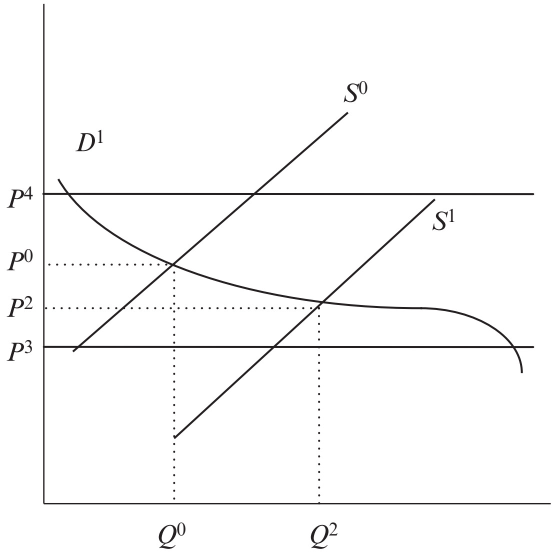


Figure 6.1c Supply expansion with elastic demand and trade linkages

more elastic, and shifted outward, through market-facilitating public investments and policy choices and by nurturing important marketing institutions.

Physical Infrastructure

The size of the market is determined by marketing costs. Transport costs are generally a large component of price differences between surplus and deficit areas (Ahmed and Rustagi, 1984). As transport costs decline, the size of the market expands for any particular farmer and demand becomes more elastic. This is analogous to the situation of a small country supplying products to the world market – the huge size of the world market relative to the small country's production makes the demand function that it faces perfectly elastic (flat).

Regional Trade

In combination with good transport infrastructure between countries, regional trade has the potential to expand the size of the market, increase the elasticity of demand facing farmers, and reduce price instability. For non-tradable commodities where price shocks are mainly generated by domestic events such as weather, the magnitude of the shock will largely determine the variability of domestic production. But local production shocks can be mitigated by regional trade, which tends to stabilize markets by linking together areas with covariate production (Koester, 1986).

Streamlining Regulations and Trade Barriers

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

Rural Financial Markets to Improve Traders' Capacity to Absorb Surplus Production

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

Diversification of Food Consumption Patterns

When food consumption patterns become more diversified, markets become more interlinked and stable than in cases where one commodity dominates food consumption patterns. The former dominance of white maize has given way to more diversified food systems. In many rural areas of Malawi, Zambia and Tanzania, cassava cultivation has increased dramatically. The increasing role of cassava, a drought-tolerant crop that can be stored in the ground, provides new potential to stabilize food consumption in the face of maize production shortfalls (Nielson and Haggblade, forthcoming). The availability of a drought-tolerant crop that is less prone than maize to extreme production fluctuations provides some relief in the degree to which maize supplies can fluctuate from year to year without seriously aggravating food insecurity.

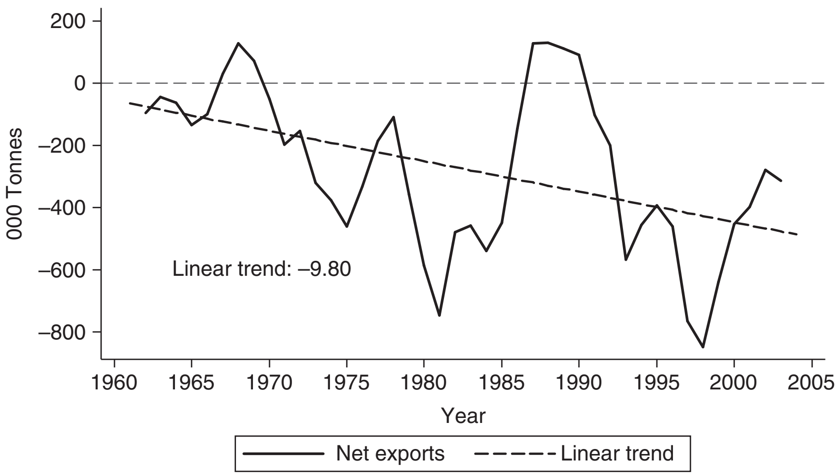
Development of World Food Markets: Increase the World Supply and Trade in White Maize

Until recently, the world market for white maize was thinly traded and hence small absolute changes in import demand in Southern Africa had the potential to influence world prices. The rationale for some level of stockholding is more compelling in such cases. However, in recent years, the white maize market has become much more heavily traded due to the effect of the North American Free Trade Agreement (NAFTA), which, since 1997, has induced a large white maize supply response in the United States to export to Mexico. These developments have mitigated the potential for white maize prices and supplies to become tight when the Southern African region experiences a drought, and thus reduces the rationale for keeping large government stockpiles of white maize to stabilize supplies (Tschirley et al., 2006).

5 GRADUAL MOVEMENT OF THE REGION TO STRUCTURAL CEREAL DEFICIT[5]

Both the Eastern and Southern African regions are moving towards structural maize deficit. This conclusion is based on trend analysis of net export data of maize grain and meal. Although FAO trade data do not capture unrecorded trade flows between countries, the net impact on regional net exports is virtually zero, since each bag of unrecorded cross-border exports from one country in the region is imported by another country in the region.

Net exports regressed on a linear time trend in both regions show statistically significant downward slopes. Net maize (grain plus meal) exports in the Southern African region declined at a rate of −72,201 tonnes per year for the 1960–2005 period. Net maize exports over the same period in East Africa declined at the rate of −9,798 tonnes per year (Figure 6.2). There



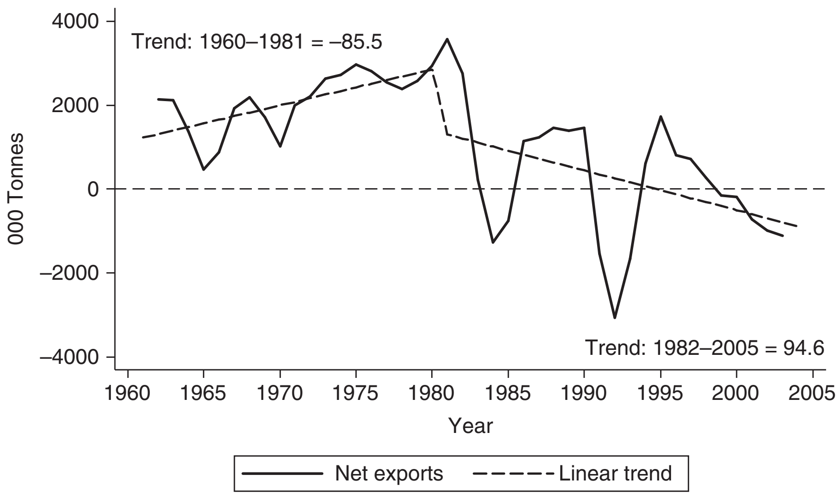
Source: FAOSTAT (2006).

Figure 6.2 Net exports of maize grain and maize meal in Eastern Africa

is no significant difference in the trend in net exports in Eastern Africa between 1960–81 and 1982–2005. Net exports in Southern Africa increased by 85,544 tonnes per year for the 1960–80 period and then declined by 94,586 tonnes per year during the 1981–2005 period (Figure 6.3).

At the country level, there was a downward trend in net maize exports in all countries of Southern Africa, with all of these being statistically significant at the 5 per cent level. In East Africa, there was a significant downward trend in net maize exports for two of six of the East African countries (Kenya and Rwanda), while for Ethiopia the trend is positive and significant. The trend is weakly negative in Tanzania and weakly positive in the Democratic Republic of Congo (DRC). Kenya, Malawi and Zimbabwe, all net exporters of maize in the 1970s and 1980s, are now chronic importers. The reduction of maize production subsidies in South Africa has also reduced the exportable surplus in that country, although it remains a reliable exporter.

In recent years, and especially after the inception of political turmoil in Zimbabwe in the late 1990s, South Africa has become the only reliable exporter of white maize in the region. Areas of Mozambique, Zambia and Tanzania typically produce maize surpluses, and although these surpluses are not large, they often play a major role in supplying the food requirements of deficit parts of the region. Informal trade flows from Zambia to the DRC, from northern Mozambique into Malawi, and from eastern



Source: FAOSTAT (2006).

Figure 6.3 Net exports of maize grain and maize meal in Southern Africa

Uganda into Kenya appear to be substantial in some years, despite frequent official efforts to suppress these flows or tax them heavily. A more consistent and stable regional trade policy environment would reduce the magnitude of price volatility and risk in the region, encourage greater input use and food production in high-potential areas, and reduce the region's dependence on imported grain from South Africa and the international market.

6 IMPLICATIONS OF HIGHER INTERNATIONAL FOOD PRICES

In early 2008, world market prices for major food commodities such as grains and vegetable oils rose sharply to historic highs, more than 50 per cent above levels during the past decade. The rise in food commodity prices since 2006 reflects both structural and transitory factors (Trostle, 2008). Among the structural factors are the integration of food and fuel markets due to increased use of grain as biofuels, the projected secular rise in energy prices and fertilizer costs, increased demand for animal products (and therefore grain feed such as maize) in China and other developing areas that are experiencing rapid income growth, and possibly increased food production variability in major growing areas due to apparent changes in climate and growing conditions. Transitory factors include transitory weather shocks in 2006 and 2007 in some major grain- and oilseed-producing areas, global food commodity price inflation partially driven by the declining value of the US dollar, growing foreign exchange holdings by major food-importing countries, and food export bans adopted recently by some exporting countries to mitigate their own food price inflation. Notwithstanding these apparent transitory factors, it is likely that international food prices will be significantly higher in the next decade than in the previous several decades.

Food markets are becoming increasingly integrated with oil and sugar markets because they are all becoming partial substitutes in the demand for fuel. The rapid investment in biofuel development in South Africa is likely to raise the price surface for grain in that country, which will in turn raise import parity prices in much of Southern Africa. Higher import parity prices will bring important challenges for protecting millions of low-income consumers during drought years, and may change the costs and benefits of alternative food supply stabilization approaches.

There are likely to be several important outcomes culminating from the combination of a long-term rise in international food prices and a continuation of the trend toward structural food deficits in both Eastern and Southern Africa. The most important of these is that the region is likely to face much higher import parity prices when it faces food production shortfalls. Governments in the region are likely to allocate more resources to strategic maize security stockholding and may feel compelled to close their borders to trade even more frequently in order to conserve scarce supplies in times of crises. Yet these short-term reactions to food production shortfalls present the risk of diverting attention and scarce resources to the major long-term challenge of building the capacity and productivity of smallholder agriculture. In countries such as Malawi and Zambia, where over 50 per cent of the government budget to agriculture is spent on input subsidies and marketing board operations, allocations to crop science, agronomic programmes, irrigation, infrastructure, and other critically important public goods investments remain negligible. Chronic underprovision of these public goods contributes to the erosion of smallholder productivity, leading over time to a greater frequency and severity of food production shortfalls and increased reliance on more costly food imports. These trends in turn reinforce the sense of urgency and the political momentum for crash programmes such as massive input subsidy programmes and strategic foodgrain stock and release policies to avert food crises.

Hopefully, the need to address periodic food crises will not divert attention from the challenge of raising smallholder agricultural productivity.

If this objective can be achieved, then consumers and governments in the region may not need to face high international food import prices because farmers in the region would be able to fulfil domestic requirements through local production and regional trade. The current situation of relatively high international food prices may provide an opportunity for achieving a supply response from local producers.

7 SUPPLY RESPONSE: CAN SMALLHOLDER FARMERS RESPOND TO HIGHER PRICES?

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

Decline in Land/Labour Ratios and Inequitable Land Distribution

Relative to other areas of the developing world, Africa has been seen as a continent of ample land and scarce labour. While this was true decades ago and may still apply to some areas where smallholders leave arable land uncultivated due to lack of labour or draught power, it no longer applies to much of Southern and Eastern Africa. One of the most important trends in African agriculture is a steady decline in the land-to-person ratio. Between 1960 and 2000, according to FAO data, the amount of arable land under cultivation (including permanent crops) has risen marginally, but the population of households engaged in agriculture has tripled. This has caused a steady decline in the ratio of arable land to agricultural population (Table 6.2). In Kenya, Ethiopia and Zambia, for example, this ratio is about half as large as it was in the 1960s.

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

Table 6.2 Ratio of cultivated land to agricultural population (10-year means)

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

Note: Land to person ratio = (land cultivated to annual and permanent crops) / (population in agriculture).

Source: FAOSTAT website: www.faostat.fao.org/.

farm sector itself. For example, landholding within the smallholder farm sector is typically characterized as small but relatively 'unimodal', equitably distributed, and situated within a 'bimodal' distribution of land between large- and small-scale farming sectors. By contrast, Jayne et al. (2003) found consistently large disparities in land distribution within the small farm sector using national household survey data in Ethiopia, Kenya, Malawi, Mozambique, Rwanda and Zambia (Table 6.3). While average landholdings in the small farm sector range from between 2.5 and 3.0 hectares in Kenya and Zambia to around one hectare in Rwanda and Ethiopia, these mean that farm-size values mask great variation.

For example, after ranking all smallholders by household per capita land size, and dividing them into four equal quartiles, households in the highest per capita land quartile controlled between five to 15 times more land than households in the lowest quartile (Table 6.3). In Kenya, for example, mean farm size for the top and bottom land quartiles were 6.69 and 0.58 hectares, respectively, including rented land. The range of computed Gini coefficients of rural household land per capita (0.50 to 0.56) from these surveys show land disparities within the smallholder sectors of these countries that are comparable to or higher than those estimated for much of Asia during the 1960s and 1970s (Haggblade and Hazell, 1988). If the large-scale and/or state farming sectors in our case countries were included, the inequality of landholdings would rise even further.

An additional problem is the extremely low absolute level of landholding/capita among some households. In each country, the bottom 15 to 20 per cent of small-scale farm households are approaching landlessness,

Table 6.3 Mean attributes by household landholding size per capita, various African countries

Country (survey year)	Household attribute	Total sample	Means for household quartiles ranked by per capita farm size			
			1	2	3	4
Kenya (2000)	Landholding size per capita (ha)	0.33	0.08	0.17	0.30	0.76
	Landholding size (ha)	1.77	0.64	1.18	1.84	3.45
	Gross value of crop sales (2000 US$ per hh)	1,067	485	751	1,420	1,612
	Household income (2000 US$ per capita)	553.9	272.6	379.4	568.2	998.4
	Off-farm income share (%)	30.5	37.3	27.7	29.2	27.9
Ethiopia (1996)	Landholding size per capita (ha)	0.24	0.03	0.12	0.22	0.58
	Landholding size (ha)	1.17	0.20	0.67	1.15	2.58
	Gross value of crop sales (1996 US$)	145.8	33.7	82.3	120.6	265.2
	Household income (1996 US$ per capita)	71.6	53.1	52.1	88.3	91.0
	Off-farm income share (%)	8.1	13.7	9.0	5.4	4.6
Rwanda* (2000)	Landholding size per capita (ha)	0.16	0.02	0.06	0.13	0.43
	Landholding size (ha)	0.71	0.32	0.63	1.00	1.82
	Gross value of crop sales (1991 US$ per hh)	68.0	34.1	45.1	72.4	169.3
	Household income (1991 US$ per capita)	78.7	54.5	59.4	79.3	139.7
	Off-farm income share (%)	24.8	34.5	24.4	22.2	18.2
Mozambique (2002)	Landholding size per capita (ha)	0.41	0.09	0.22	0.37	0.96

Table 6.3 (continued)

Country (survey year)	Household attribute	Total sample	Means for household quartiles ranked by per capita farm size			
			1	2	3	4
	Landholding size (ha)	1.66	0.53	1.20	1.76	3.14
	Gross value of crop sales (2002 US$ per hh)	26.7	9.4	20.9	27.3	49.1
	Household income (2002 US$ per capita)	59.5	45.7	46.4	55.4	90.6
	Off-farm income share (%)	27.3	34.3	26.6	24.9	23.5
Zambia (2000)	Landholding size per capita (ha)	0.58	0.11	0.27	0.50	1.42
	Landholding size (ha)	2.73	0.74	1.60	2.75	5.81
	Gross value of crop sales (2000 US$ per hh)	72.2	32.7	59.2	83.6	113.4
	Per capita income (2000 US$ per capita)	122.3	107.5	107.0	115.6	159.2
	Off-farm income share (%)	28.5	39.7	26.9	25.0	22.2

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

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

controlling less than 0.5 hectares. In Ethiopia and Rwanda, the bottom land quartile controlled less than 0.20 and 0.32 hectares per capita. In Malawi, 80 per cent of all smallholder households possess less than one hectare of land (Chirwa, 2006).

Both the inequality of land access and the low absolute levels of land/capita of some households are problematic for poverty reduction and growth for several reasons. First, there is a strong relationship between access to land and household income in Southern and Eastern Africa, particularly for farm sizes below 1 hectare per capita (Jayne et al., 2003). Mean total household incomes of the top land quartile are double those of the bottom quartile (Table 6.3). This relationship appears to be driven by limited access of land-poor households to lucrative non-farm income opportunities and higher-value crop or livestock markets (ibid.). Second, it is generally accepted that 'pro-poor' agricultural growth is strongly associated with equitable asset distribution (Datt and Ravallion, 1998; Ravallion and Datt, 2002), yet surprisingly little attention has been devoted to considering the implications of land inequality in poverty reduction strategies.

Concentration of Farm Sales of Maize and Other Crops

One potential pathway out of poverty for smallholders with limited landholding is to earn greater returns per unit of land by diversifying into higher-value crops and animal products. There is some evidence that this is occurring. Yet, in general, the descriptive evidence shown in Table 6.3 suggests that many land-poor smallholders are not able to compensate for low landholdings through cultivation of higher-value crops, as crop sales income is strongly correlated with landholding size. Such opportunities are impeded by factors which raise the costs and/or risks of household staple food acquisition through markets (in addition to input and output marketing constraints common to small farmers). That is, the higher the price of food, and the greater the price variability during the lean season, the greater are household incentives to revert to self-provisioning of food staples (Fafchamps, 1992; Jayne, 1994; Omamo, 1998). Thus, diversification into higher-value crops is most likely to occur in densely populated rural areas and peri-urban areas, where high population pressure results in low land/labour ratios, food markets are more likely integrated with nearby urban markets, and demand for horticultural crops and animal products is high.

Household Position in Maize/Maize Meal Markets

Because maize is not only a major staple in many regions of Eastern and Southern Africa but also a cash crop, we might expect smallholders to more readily commercialize a crop which is both consumed and marketed. Yet, the evidence suggests that the combination of inequitable land access and large variations in crop productivity across households and regions contributes to considerable heterogeneity with respect to smallholders' position in staple food markets (Table 6.4).

For example, large representative rural household surveys in Eastern and Southern Africa, where white maize is a staple food crop, indicate that small-scale farm households generally fall into one of the following four categories with respect to the grain market:

Table 6.4 Distribution of small-scale farm population according to their position in the staple grain market, selected countries

Household category with respect to main staple grain:	Zambia (maize)	Mozambique (maize)	Kenya (maize)	Malawi (maize)	Ethiopia (maize and teff)
	% of rural farm population				
Sellers only:	19	13	18	7	13
top 50% of total sales*	2	2	2	1	2
bottom 50% of total sales**	17	11	16	6	11
Buyers only	33	51	55	59	60
Buy and sell (net buyers)	3	12***	7	4	13
Buy and sell (net sellers)	6		12	3	12
Neither buy nor sell	39	24	8	27	2
	100%	100%	100%	100%	100%

Notes:
* After ranking all households by quantity sold, this row shows the percentage of households in the smallholder sector accounting for the first 50% of total maize sales.
** Percentage of households accounting for the other 50% of total maize sales.
*** The survey in Mozambique was not able to ascertain quantities of maize purchased therefore whether these households are net buyers or net sellers is unknown.

Source: Reproduced from Jayne et al. (2006), who compiled the data from the following sources. Zambia: Central Statistical Office Supplement to the Post Harvest Survey, 2000/01 marketing year; includes small-scale (0.1–5 hectares) and medium-scale (5–20 hectare) farms, proportional to probability sampling. Kenya: Tegemeo Institute Household Survey, Egerton University, 1999/2000 season, nationwide sample. Mozambique: TIA Household Income Survey 2001/02. Malawi: Chirwa (2006), based on analysis of nationwide Malawi Integrated Household Survey, 1997–98, Government of Malawi. Data on maize purchases is limited to a 3-day recall period hence computation of maize purchases for the marketing year is not possible. Ethiopia: Central Statistical Authority, Government of Ethiopia, Food Security Survey, 1995/96 season.

1. *Sellers of staple grains* Roughly 20 to 35 per cent of the smallholder farms sell maize in a given year. Of course this figure will rise in good harvest years and fall in a drought year. However, there are two subgroups within this category:

   a) a very small group of relatively large and well-equipped smallholder farmers with 4 to 20 hectares of land, usually in the most favourable agro-ecological areas (about 1 to 4 per cent of the total rural farm population), accounting for 50 per cent of the marketed output from the smallholder sector. These farms tend to sell between 5 and 50 tonnes of maize per farm in a given year; and

b) a much larger group of smallholder farms (20 to 30 per cent of the total rural farm population) selling much smaller quantities of grain, between 0.1 and 5 tonnes per farm. These households tend to be slightly better off than households that buy grain, but the differences are not very great in absolute terms.

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

2. *Buyers of staple grains* These rural households generally make up 50 to 70 per cent of the rural population, higher in drought years and lower in good production years. These households are generally poorer and have smaller farm sizes and asset holdings than the median rural household. They are directly hurt by higher mean grain prices.
3. *Households buying and selling grain within the same year* In all of the nationwide surveys, relatively few households both buy and sell maize.[6] Only about 5 to 15 per cent of the rural population buys and sells maize in the same year. They comprise both relatively large farms that sell grain and buy back lesser amounts of processed meal, as well as relatively poor households that make distress sales of grain after harvest only to buy back larger amounts later in the season. However, this latter subgroup typically comprises less than 10 per cent of the rural farm population.
4. *Households neither buying nor selling maize* These households make up a small proportion of the rural population in areas where maize is the dominant staple crop. However, in parts of northern Zambia and Mozambique, cassava is the main staple. Because of this, a sizeable fraction of the rural population at the national level is autarkic with respect to maize.

Staple grain sales can be highly concentrated among a relatively small number of large and commercialized farmers in the smallholder sector. Table 6.5 disaggregates smallholder households included in the nationwide surveys into three groups: (i) the largest smallholder sellers of maize who

Table 6.5 Characteristics of smallholder farmers classified by participation in the maize market, Zambia (2000/01), Mozambique (2002/03) and Kenya (1999/00)

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

Table 6.5 (continued)

	Maize sellers		Households not selling maize
	Farms accounting for top 50% of total maize sales	Rest of maize sellers	
	(1)	(2)	(3)
Gross revenue, maize sales (US$)			
Zambia	690	74	0
Mozambique	509	20	0
Kenya	3,474	162	0

Notes:
[a] Livestock plus farm equipment except for Mozambique, which is livestock assets only. Because the distribution of off-farm income is highly skewed, the reader is advised not to compute the share of off-farm income by using the mean off-farm income divided by mean total income.

Source: Supplemental Survey to the 1999/00 Post-Harvest Survey, Central Statistical Office, Lusaka, 2001.

accounted for 50 per cent of the marketed maize output; (ii) the remaining households that sold maize during the year who accounted for the other 50 per cent of the marketed output, and (iii) those households that sold no maize during the 12-month marketing season.

As shown in Table 6.5, 1 or 2 per cent of the farms account for 50 per cent of the overall marketed maize surplus from the smallholder sector. These farm households appear to enjoy substantially better living standards, in terms of asset holdings, crop income and non-farm income, than the rest of the rural population. The relatively 'elite' smallholder farmers had roughly 2–5 times as much land and productive assets as the non-selling households, 2–7 times as much total household income, and 3–8 times more gross revenue from the sale of all crops.

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

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

A second implication of the substantial differentiation within the smallholder farm sector is that the benefits of mean-raising food price stabilization policies are likely to be extremely concentrated. This was a major outcome of the price support and stabilization policies pursued during the pre-liberalization period. Jayne and Rukuni (1993), using data on maize purchases by Zimbabwe's Grain Marketing Board (GMB) between 1985/86 and 1991/92, found that 1 per cent of the nation's smallholder households accounted for 44 per cent of all the maize delivered to the GMB by smallholder farmers. These 9,000 households sold an average of 28.2 tonnes per year to the GMB. Another 80,000 households (the next 9 per cent of smallholder households in terms of maize sales) sold an average of 3.4 tonnes, accounting for 26 per cent of the smallholder sector's maize deliveries to the GMB (Table 6.5). Of the remaining 800,000 smallholder households in the country, only 24,000 sold any maize, and those that did so accounted for 4 per cent of the total maize delivered to the GMB by the smallholder sector. Of course, the total smallholder sector of 900,000 households received only 54 per cent of the government outlays on maize purchases over this ~~7~~=year period, as 4,000 large-scale farmers received the rest.

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

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

8 SEGMENTATION BETWEEN FORMAL MARKETS AND INFORMAL FOOD MARKETS

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

1. commodity exchanges, including futures and options markets, enabling farmers and marketing agents to reduce risks of current and future investments;
2. a network of integrated silos, millers and supermarket retailers, often with transnational firm ownership;
3. market information accessible on a daily basis, some of which is public, and some which is proprietary, providing asymmetric information advantages for those willing to pay;
4. large transaction volumes, which enables transaction costs to be spread over greater quantities traded, hence reducing per unit marketing costs;

5. well-specified grades and standards to allow for remote contracting by commodity specification rather than by visual inspection;
6. legal systems to accommodate more sophisticated contracting arrangements and facilitation of contract disputes; and
7. organized lobbies representing firms widely perceived as having a legitimate interest and voice in the determination of regulations governing agricultural markets.

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

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

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

Applied research in the region has shown the increasingly adverse impacts on rural and urban consumers' food insecurity resulting from the segmentation of these marketing channels. For example, the Zambian government has in the past frustrated private imports during food shortages by sending confusing signals to markets. During the 2001/02 food crisis in Southern Africa, the government announced its intention to import 200,000 metric tonnes of maize grain to cover a national deficit, and to sell that grain at below-market prices directly to a small number of large formal sector millers. Given this announcement, other potential private importers, including informal traders from Mozambique, held off (Mano et al., 2002). When government instead imported only 130,000 metric tonnes and did so very late in the season, prices rose steeply, since this amount was insufficient to meet demand (Nijhoff et al., 2002). Moreover, because grain was channelled only to large millers (rather than released onto informal public markets), consumers had to pay the high price of refined meal instead of being able to source grain in informal markets and mill it more cheaply through the network of informal sector hammer mills.[9]

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

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

9 THE RISE OF CASSAVA

Food production and consumption patterns have changed markedly over the past decade. The former dominance of white maize has given way to more diversified food systems.

In many rural areas of Malawi, Zambia and Tanzania, cassava cultivation has increased dramatically.[10] The rise of cassava is not unrelated to maize policy. The elimination of pan-territorial maize pricing policies in the early 1990s has reduced the profitability of surplus maize production in remote areas. Cassava production has risen substantially in many of these areas.

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

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

Because farmers can harvest perennial foodcrops such as banana and cassava any time of year and over multiple seasons and years, they are able to respond very flexibly to crises as well as chronic shortfalls in neighbouring regions (Nielson and Haggblade, 2008). In drought years, when most maize-dominated zones face shortfalls, farmers from neighbouring areas are able to harvest more of their perennial reserve crops (cassava or bananas) and in turn free up more cereals (primarily maize) for export to deficit zones.

10 CONCLUSIONS AND POTENTIAL OPTIONS FOR THE FUTURE

Agricultural market reform in most of Eastern and Southern Africa over the past 20 years was initiated under pressure in an environment of aid conditionality. Few senior policy makers trusted the ability of the private sector to meet the needs of smallholder farmers and even fewer actually embraced and supported the food market liberalization process. When donors transitioned from aid conditionality to direct budget support in the mid/late 1990s, the fiscal constraints that had limited the state's direct role in food markets were eased. Consequently, by the early 2000s, and progressively since then, the maize marketing systems in much of Eastern and Southern Africa retain fundamental similarities to the controlled marketing systems of their earlier histories. Some aspects of policy change have been implemented, primarily the legalization of domestic private trading, and marketing board activities have been downsized in response to the unavailability of funds to continue trading at levels during their controlled marketing periods. In countries where marketed surpluses are falling and national food security relies increasingly on imports (for example, Malawi), the marketing boards' role has shifted more towards importation, stockholding, and release onto markets at subsidized prices. Despite the quite significant role that marketing boards in these countries continue to play up to the present, maize price volatility and its potential effects on production incentives and food security remain critical concerns.

Perhaps the greatest irony of the aid conditionality process in the region is the widespread perception that the World Bank has forced these African governments to implement orthodox agricultural policy reform, and that the lack of clear economic turnaround in the region casts doubt on the technical logic of the Bank's model. The weight of the empirical evidence indicates that many countries in Eastern and Southern Africa have continued food price stabilization with subsidy programmes of various types, and hence an empirical assessment of these countries' food market performance since the 1990s reflects not the impacts of unfettered market forces but rather the mixed policy environment of legalized private trade within the context of continued strong government operations in food markets. There is widespread agreement that the food marketing policy environment over the past decade has not effectively supported agricultural productivity growth for the millions of small farmers in the region (Dorward et al., 2004).

Although price stabilization could have important benefits for producers and poor consumers, these benefits do not appear to have been successfully achieved by the existing mix of import tariffs, sporadic export bans, and marketing board operations to influence producer and consumer prices. 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, 2008). 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 et al., 2008). While it is difficult to estimate the counterfactual, that is, 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. In some countries in the region, government policy has tended to raise maize market prices, generating distributional effects that were most likely anti-poor (ibid.). While the full general equilibrium effects of government price policy, including their effects on the labour market, have rarely, if ever been estimated for this region, the information on small farm production and marketing patterns presented earlier in this chapter suggest that mean-raising price policies are likely to have very concentrated benefits among relatively large farmers and would constitute a direct tax on consumers, many of whom are small farmers living in rural areas. Knowing the potential distributional consequences of any policy influencing staple prices would need to take into account knowledge of land allocation patterns in smallholder farming systems, the concentration of marketed food output, and trends towards smaller farm sizes and increased land constraints as population pressures intensify. This information will seriously affect the costs and benefits of alternative approaches to price stabilization, particularly those that are likely to alter the mean as well as the variance of food prices.

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 (for example, road, rail and port infrastructure, agricultural extension systems, market information systems) and institutional change to promote the functioning of market-orientated trading systems.[12] Specific proposals could be organized by African-led regional or continental platforms such as COMESA (Common Market for Eastern and Southern Africa) or NEPAD/CAADP (New Partnership for African Development/Comprehensive African Agricultural Development Programme) to mobilize national government commitment for pro-poor investments that international donors and lenders could feasibly support. Priority areas would include:

1. Follow clearly defined and transparent rules for triggering government intervention. A major challenge is how to move away from a situation where leaders feel they have to be seen as 'doing something' by taking populist stances that may entrench dependence on food or fertilizer handouts in response to instability-related food crises, but which do little to alleviate poverty or hunger in the longer run, and how to create constituencies for policies that are believed to promote market stability and small farm incentives to sustainably use improved seed and inputs, but which may not necessarily provide short-term patronage benefits. Given that governments are likely to continue intervening in food markets, predictable and transparent rules governing state involvement in the markets would reduce market risks and enable greater coordination between private and public decisions in the market. The phenomenon of subsidized government intervention in

the market, or the threat of it, leading to private sector inaction, is one of the greatest problems plaguing the food marketing systems in the region. Governments and private trading firms strategically interact in staple food markets responding 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 (Brunetti et al., 1997), especially with regard to changes in parastatal purchase and sale prices, import and export decisions, and stock release triggers. This uncertain environment has clearly dampened the private sector's response to market reform in the region. Yet it is unlikely that a marketing system that provides sustainable and reliable access to credit, input and output markets can be put in place over the long run without the private sector being the major impetus behind it.

2. Performance contracts with international seed companies to work with national and regional agricultural organizations to develop improved maize seed technology relevant for the semi-arid areas that characterize much of Eastern and Southern Africa (Bagwati, 2005; Lipton, 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.
3. Rehabilitation and expansion of port, rail and road infrastructure within the region. Because much of the maize price instability problem, and its associated effects on smallholder production incentives and food insecurity, is related to high costs of transport within the region and between the ports and major production and consumption areas, the reduction of transport costs would go a long way to improving the stability of maize prices and supplies in the region. While such investments would take years to put into place, it is clear that such investments must be part of an overall pro-poor productivity growth strategy for the region. Donor development assistance for physical infrastructural development could play a major supportive role to the future of smallholder agriculture.
4. 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, we caution that viable market-orientated risk

transfer mechanisms would be unlikely to develop in a market environment where one actor had the power and proclivity to influence price levels in a discretionary way, as this would mean that certain actors would have an information advantage in the purchase or sale of commodity instruments and could exercise that advantage to the disadvantage of others. This would have obvious implications for a strategic food reserve or public buffer stock programme.

5. Support for public extension systems. Household survey data indicate that, within a given community or district, maize yields and productivity are highly variable across households (for example, Nyoro et al., 2004). The variation in maize production costs, even controlling for production technologies, tends to be very high. This suggests that variations in management practices and husbandry skills are probably very great, underscoring the importance of appropriate extension messages. Simply by bringing the relatively high-cost producers to the mean in a particular area, the overall costs of maize production could decline significantly and improve smallholder incomes and food security. Donors could once again play an important supportive role in this regard. Even indirect support, for example, funding for soil testing, developing recommendations for fertilizer application rates that take into account the micro variability in soil, rainfall and market conditions, could be a big help.
6. Institutional/organizational innovations to improve vertical coordination. Production cost advantages that smallholder farmers typically have in food production are often offset by weak market access – for credit, inputs and commodity sales. Because most smallholders have small quantities to sell, they involve high transaction costs for traders unless farmers can bulk up their sales and sell as a group. Forms of group credit for purchasing agricultural inputs have also shown some success. Outgrower arrangements, involving the interlocking of credit, inputs and output sale, have sometimes been successful in improving vertical coordination in commodity supply chains where the output market could be controlled, which seldom includes food crops (Dorward et al., 1998). Cash crop outgrower schemes providing credit to participating farmers have also generated important synergies and spillover benefits for smallholder food crop production (Dione, 1989; Jayne et al., 2004). While farmer organizations may provide only limited scope for stabilizing commodity prices for farmers, they have shown great potential to provide a stable stream of income, help smallholders engage in higher-return crop activities, and promote farm productivity and food security, which may be of greater importance than price stabilization *per se.* There would appear

to be significant unexploited potential to expand the role of outgrower arrangements and farmer organizations in the region, both as a means to reduce the risks and transaction costs between small farmers and trading firms and to promote smallholder incomes from an integrated credit-input–crop marketing system that would benefit maize production as well as selected cash crops.

7. Relieving constraints on access to land. Smallholder supply response is also constrained by farm structure, with over half of the small farms in the region less than one hectare in size (Jayne et al., 2003). These farms cannot earn a viable livelihood through a maize commercialization strategy unless there is tremendous growth in maize productivity, which will require sustained and dedicated investment in crop science and extension.

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

   Where there currently exist large tracts of 'remote' but productive land, the public sector can play an important role in raising the returns to settlement in such areas through service provision and infrastructural development to better link currently isolated areas with existing road and rail infrastructure. This may help reduce the current population pressure in areas of relatively good access to markets through migration to areas of low population density but which have experienced an increase in the economic value of land through public investments in infrastructure and service provision. Such an approach was pursued successfully by Southern Rhodesia and Zimbabwe starting in the 1960s with its 'growth point' strategy in the Gokwe area, once cleared of tse tse fly. 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 (Govereh, 1999).

8. An important component of an agricultural markets programme should be on-the-ground monitoring of programme/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 more accurately measure the impacts of particular marketing policy strategies. This will reduce the tendency to mis-identify policy effects and thereby provide a more accurate empirical foundation for future discussions of food marketing and trade policy options.

These eight specific areas for government action constitute a tall agenda. Implementing it will require close dialogue and coordination with international lenders and donors, not only to help with financial support, but also to help in working out the details of implementation, including the detailed 'how' questions. By taking the initiative and engaging donors through African-driven initiatives like NEPAD and CAADP, governments in the region can show real commitment to this agenda. This agenda can go forward with implementation without necessarily needing to resolve at the same time the more thorny issues such as fertilizer subsidies and marketing board price stabilization policies. Getting consensus and action on part of the agenda would most likely be strongly preferable to having the whole process stalled over a few contentious issues.

Perhaps the most vital question is whether a local constituency can be formed that can stake a claim on public resources in support of agricultural research, marketing institutions and other kinds of growth-promoting public goods. There is an obvious connection between agricultural development and governance. The early success of the maize industry in Zimbabwe and Kenya can be largely attributed to the strength of the institutions built by settler farmers, which mobilized a constituency to support public and private investments. Today, farm lobbies are generally weaker and more fragmented. Representation has always been weak for smallholder farmers, particularly when their welfare is closely tied to the reliability and efficiency of maize markets where they purchase maize as consumers. How will growth- and equity-promoting investments in agricultural research, infrastructure and market institutions be financed? Where will the domestic political pressure for these public investments originate?

NOTES

1. Much of the data used in this chapter were collected under the Food Security III Cooperative Agreement and the Tegemeo Agricultural Monitoring and Policy Analysis Project, both funded by USAID.
2. For an analysis of how maize marketing and trade controls in the colonial period were used to support colonial settler farmers, often at the expense of African farmers, see Mosley (1975) for the case of Kenya; Keyter (1975) for Southern Rhodesia/Zimbabwe, and Jansen (1977) for Northern Rhodesia/Zambia.
3. For example, in the early 1990s, Zimbabwe's Grain Marketing Board's deficits were 5 per cent of GDP (Jenkins, 1997). By the late 1980s, Zambia's subsidies to the maize sector reached 17 per cent of the national budget (Howard and Mungoma, 1997).
4. President Frederick Chiluba adopted widespread food and input market reform programmes in the early 1990s, but based on charges that he deserted the small farmer, reintroduced major input subsidy programmes by 1994 and created a new food marketing parastatal, the Food Reserve Agency, in 1996. Levy (2003) argues that Malawi's starter pack programme, featuring small amounts of free maize seed and fertilizer for almost every rural household in the country, 'probably contributed to the re-election of President Bakili Muluzi in 1999'.
5. This section draws heavily on Chapoto and Jayne (2006).
6. This empirical regularity contrasts with the common notion that, because of lack of credit, farmers typically sell at harvest at low prices and buy back later at higher prices.
7. Of course, a general equilibrium approach, taking into account indirect effects on welfare through labour market effects, would need to be undertaken before the welfare effects of mean-altering price policies could be fully understood.
8. Our premise is that while developing markets for higher-valued crops is crucial for improving smallholder income and food security, this approach should be viewed as a complement not an alternative to the development of reliable food marketing systems to serve smallholders. Research has shown that smallholders' ability to diversify into high-valued non-food crops depends crucially on the ability of food markets to ensure reliable supplies at tolerable prices (for example, Jayne, 1994; Omamo, 1998).
9. Jayne et al. (1996), studied the cost differences of refined maize meal supplied through formal sector channels and the less-refined meal available through hammer mills in informal markets in five countries in Southern Africa during the mid-1990s. They find that the hammer-milled meal could generally be obtained at 65–80 per cent the cost of meal provided through formal sector outlets. However, when public markets become thinly traded and informal traders are not able to continue supplying these markets, consumers lose the option of hammer milled meal and have become reliant on the more expensive formal sector channels for their maize meal.
10. OLS time trends showed annual increases of 1.9, 7.1 and 5.2 thousand hectares of cassava in Kenya, Malawi and Zambia, respectively, with *t*-statistics of 3.74, 3.66 and 7.68.
11. Policy-induced shifts in cropping patterns from maize to cassava and other food crops

are apparent in northern Zambia and parts of Tanzania. However, Uganda and most of Tanzania have historically had highly diversified food production patterns.
12. For evidence of the payoffs to these public goods investments and their contribution to agricultural market performance, see Johnston and Kilby, 1975; Mellor, 1976; Binswanger et al., 1993; and Huffman and Evenson, 1993).

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7. Unofficial cross-border trade in Eastern Africa

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1 INTRODUCTION

Informal or unofficial cross-border trade (CBT)[1] is an increasingly important phenomenon in Eastern Africa, but one that remains surrounded by controversy and ignorance. For some observers it represents a normal market response to cumbersome, time-consuming export regulations and regional price distortions, which should be encouraged as a means to increase intra-regional trade (and 'regionalization'), meet local demand that is not being met by national production and markets, and ensure regional food security. These same supporters often argue that many transborder markets pre-date colonial and post-colonial state boundaries and, thus, reflect long-standing indigenous patterns that make more sense than formal trade channels (see Meagher, 1997). For others, CBT reflects a potential loss of foreign exchange, an illegal activity, and a source of unfair competition for official traders and food producers. The contra position argues for increased regulations and taxes, policing, and/or forcing CBT into formal market channels. As Meagher's work shows (1997, 2003), it was assumed by some policy makers that structural adjustment policies of the 1980s and 1990s would have channelled most informal trade into formal market channels, which has not been the case in large parts of Africa (see also Peberdy, 2000; Little, 2001).[2] In fact, for many parts of Africa the overall effect of structural adjustment has resulted in 'a significant expansion of transborder trade' (Meagher, 2003: 57)', especially by large numbers of unemployed youth, women, and others, including ex-formal sector employees 'downsized' through budget reforms (see Boko, et al., 2005; Roitman, 2005; Mwaniki, n.d.: 1).

This chapter addresses CBT in Eastern Africa, with a particular focus on livestock trade in the Horn of Africa region (Sudan, northern Kenya, Somalia, Ethiopia, Eritrea and Djibouti). In fact almost all regional trade (more than 95 per cent) in livestock in Eastern Africa is carried out via unofficial channels. It will be shown that while the focus is on livestock trade, it affects parallel forms of CBT in other commodities, including cereals trade, and important policy lessons can be learned from its study. The chapter suggests that CBT cannot be treated as an anomaly outside of the 'formal economy' that will go away with a few policy 'tweaks' and increased enforcement. Instead, informal transborder commerce is integral to many formal market channels and influences them in subtle and not so subtle ways.

The remainder of the chapter is organized as follows. Section 2 covers current 'realities' of CBT in the region and some of the definitional and conceptual problems that surround the activity. Section 3 examines the importance of trader networks, while in Section 4 the case of CBT in livestock in the Horn of Africa is discussed, highlighting some of the differences and similarities between CBT in livestock trade and in other foodstuffs, particularly grain and flour. The effects of CBT on local and regional food security and economies are examined in Section 5. Section 6 looks at the policy challenges and opportunities associated with CBT, and shows how concerns about national sovereignty and security issues complicate CBT policy dialogue. Recent government awareness in the Horn region about illegal arms trade and international terrorism has made it particularly difficult for governments to avoid special attention to border regions and their trade.

2 REALITIES OF CBT

There is considerable confusion over what informal CBT is and what it is not. A first distinction that needs to be made is in the types of products that are traded, especially differences between trade in legal and trade in illegal products (see Meagher, 1997). The two are often conflated in policy discussions and can lead to misinformed interventions. CBT is 'illegal' in many countries of the region because it avoids official procedures and channels, but it does not mean that the traded products themselves are illegal. Most cross-border commerce is in 'clean'[3] commodities, although perceptions are that CBT encourages trade in illicit drugs, weapons, and other illegal and harmful goods.

A second definitional point to make is that despite common perceptions, CBT has strong ties to the formal sector. The distinctions between what is formal and informal in CBT are difficult to make. Take the case of maize that may be informally sourced from transborder markets but eventually sold through licensed retail shops in the import country; or the case of livestock that are trekked across borders to be sold but are officially taxed at different market centres and eventually sold through formal market channels. Do these constitute informal or formal trade? Contrary to common perceptions, CBT also generates significant amounts of local taxes and permit revenues for the formal sector, as well as a wide range of unofficial payments or 'taxes' to government personnel and offices. The fact that policies directed at formal food market channels can strongly affect the performance and profitability of unofficial commerce and vice versa, is further evidence of the interconnectedness of the formal and informal sectors (see Akilu, 2006; WFP/FEWSNET, 2006).

A third set of definitional issues about CBT concern the scale and spatial aspects of the activity. Much CBT involves small amounts of food products moved over short distances, for example, the Ugandan trader who cycles with two sacks of beans across the border to sell in Kenya (see Akello-Ogutu, 1997), but other types entail large volumes and vast distances (see WFP/FEWSNET, 2006). The latter might include large-scale Ethiopian traders who transport truckloads of animals 250 kilometres (km) across the Somalia border to be exported from the Somali port of Berbera, relying on market information transmitted via hand radios and faxes, and recently, mobile cell phones. The merchants then return home with considerable amounts of imported foods to be sold in eastern Ethiopia. Recent policies by some governments to permit small-scale (low-value) CBT within certain distances of borders show a recognition that important scale differences characterize the activity (for an Ethiopian case, see Teka and Azeze, 2002; Umar, 2007).

In many instances CBT may represent the only market option, especially since extremely poor infrastructure, communications and security are typical of many borderlands in Eastern Africa. Thus, the harsh *realities* of CBT which distinguish it from other commerce in the region need to be acknowledged. The most important of these are discussed in the remainder of this section.

Poor Infrastructure

Despite the political significance of borders, most international border regions are generally isolated and have very poor transport, communications and other infrastructure. They are usually distant from political and commercial centres of the country and in many Eastern African countries it can take several days to travel between the capital city and one or more of its border areas. Mwaniki (n.d.: 3) describes the infrastructure challenges of cross-border trade as follows:

> The main challenge is dealing with the infrastructural development which includes road and railway network, lack of warehousing, no internet facilities

for market intelligence; the cross border traders are restricted in accessing market information, finding out what is needed, where, in what quantities and packaging standards and so on.

The lack of storage and warehouse facilities mentioned here may relate to the fact that because of its informal nature, most merchants avoid investments in facilities that would draw attention to them. In insecure areas these kinds of infrastructure also make ideal targets for bandits and other criminal elements, as has been the case in the southern Sudan/Uganda borderlands (Nobera, 1998: 27). The irony is that the relative isolation and anaemic infrastructure in border areas actually insulates CBT from official and other types of detection.

For livestock-based CBT, another set of infrastructure needs include veterinary facilities, holding grounds and water points. These infrastructures are so poorly developed in the border areas that even if governments wanted to officially export livestock to neighbouring countries, they would be hampered in most border markets.

Volatility, Risk and Market Distortions

Several risk factors particularly affect CBT that can greatly increase market costs or even totally stop the trade. For example:

1. CBT between Somalia and Kenya has been halted several times in recent years due to conflict and by Kenya's concerns about insecurity in Somalia;
2. CBT between Ethiopia and Eritrea has been virtually nil since the war between the countries halted the trade in the late 1990s;
3. CBT between Uganda and the Democratic Republic of Congo (DRC) and between Uganda/Kenya and southern Sudan was stopped several times in recent years because of conflict and insecurity; and
4. CBT between Ethiopia and Somalia/Somaliland has been slowed numerous times in recent years due to conflict, as well as increased confiscations of trade goods by government officials.

Even in relatively secure border areas, the threat of confiscation by government officials is always there, but its enforcement is inconsistent. Interviews with Ethiopian traders and herders reveal the kinds of risks associated with different government policies regarding CBT enforcement:[4]

The border effect is not from the Kenya side. It is from Ethiopia. The prices are good. The Ethiopian government considers the animals as smuggled goods, so

> they restrict us. This restriction gives us a problem. (Interview with Ethiopian trader, October 27, 1998)
>
> Border effect? When we try to sell animals to the Kenya side, the Ethiopian government finance (customs) police consider the animals as contraband. To sell our animals on the Kenya side is not a problem to the Kenya government. When we buy things and bring them back, they can be seized and the man can be sent to jail. (Interview with Ethiopian trader, October 25, 1998)
>
> It [the border] has a very big effect because the Ethiopian government restricts it. To avoid them, we sell by passing the border. (Interview with Ethiopian herder, November 5, 1998)

As these responses indicate, CBT actors often risk confiscation of their goods. In addition to the Kenya/Ethiopia example, these deterrents have been documented in the Kenya/Somalia (Little, 2003), the Sudan/Kenya (Guvele and Lautze, 2000), and Uganda/Tanzania CBT (Nobera, 1998). In some cases, border enforcements might reflect nationalist perceptions of unequal benefits among different trading partners. For example, there is a strong perception among Ethiopian officials that Kenya is the main beneficiary of the trade. They feel that Kenyan consumers receive relatively inexpensive and good-quality Ethiopian beef, while imports of manufactured goods and clothing from Kenya unfairly compete with Ethiopia's manufacturing enterprises. Recent work in the area shows that confiscations of trade goods by officials has picked up in the past two years (Umar, 2007).

An added element of risk for the trader and producer is inconsistent border enforcement (discussed later in the chapter). In eastern Ethiopia officials sometimes 'look the other way' when CBT in bulk foodstuffs is involved but pursue punitive measures for other trade goods. The region's chronic shortage of food may be a reason for this, but it still adds to the element of uncertainty. Umar notes:

> Random checks along the roads and routes of the region regularly catch traders running goods across the border. Occasionally even stricter border blockages are enforced. Such blockages can be inconsistent and do not target all goods; exceptions are sometimes made, especially for bulk food imports, and blockages are sometimes removed altogether. The result is a confusing environment for traders. (2007: 20)

Other government actions directed at controlling CBT can greatly harm both producers and merchants and aggravate an already risky market environment. In 2005, the government of Ethiopia banned the use of Somali shillings (SoSh) in eastern Ethiopia, in order to discourage CBT.

Prior to this the SoSh currency was widely used in the area because CBT activities were calculated in SoSh, especially since exports and imports transited through ports of neighbouring Somalia (see Little, 2005).[5] With the currency ban, CBT merchants stopped going to certain areas where the directive was strictly enforced, resulting in large drops in livestock prices and increases in prices of imported foods. Moreover, as Umar notes: 'anybody found using Somalia currency was liable to imprisonment, and any Somalia currency found was confiscated . . . which was the dominant currency used to purchase small-portions of retail goods affordable for the poor' (2007: 81–2).

Market risks in CBT are also associated with political insecurity and conflict. Guvele and Lautze (2000), for instance, explain how widespread conflict in southern Sudan borderlands depressed CBT to the extent that Sudanese herders often received less than 25 per cent of gross revenues from sales to Kenya. In border areas that are highly dependent on CBT to meet consumption needs, volatility can also have dire consequences for food security. A case in point is the southern Somali borderlands, which are particularly prone to conflict and experience near famine conditions when CBT is halted (Little, 2006). Because of high risks of theft from banditry and insecurity, traders avoid these areas, disrupting trade patterns and contributing to local food and income shortages.

3 IMPORTANCE OF TRADER NETWORKS

CBT based on long-distance movements of goods often involves intricate networks of traders, financers and transporters. The nature of these networks can be as important for explaining the structure and flow of CBT as market factors, such as price and supply/demand. While these networks facilitate the trade, they can also be highly exclusive and distort supply and price conditions. For the eastern Ethiopian borderlands, Devereux describes how complicated these trader networks can be:

> Marketing in Somali Region is much more complicated than the neoclassical model of a producer selling to a consumer at a negotiated market-clearing price, perhaps with a wholesaler or retailer as market intermediaries. Partly because live animals are often involved, partly because the trade is informal – even illegal – and crosses national boundaries, and partly because of the complex interrelationships between trade routes and clan territories, there are a large number of market actors between primary producers and final consumers. The result is a marketing system that is far from anonymous and impersonal, but instead is a network of personal and clan-based relationships, with each actor dependent on the others in a way that both protects and constrains their options and opportunities. (2006: 53)

These trader-based networks can link numerous actors across vast distances of space. In the Ethiopia/Kenya cattle trade, Mahmoud (2003) estimates that more than 20 actors are involved along the approximately 800 km route from southern Ethiopia to Nairobi. Market participants include herders, brokers, middlemen, trekkers, loaders, truckers and so on. Many of the individuals work together in networks bound by common kinship, religion and/or ethnicity. In many border regions of Eastern Africa, singular ethnic groups straddle both sides. When market actors in different countries are from the same ethnic group, they can draw on a common language and identities which facilitates transactions and can reduce the costs of monitoring and enforcement. In times of conflict and heightened uncertainty these networks assume even more significance, as actors turn 'inwards' and favour transactions with those whom they know well, trust, and can converse with in a common language. When this happens it can lead to highly exclusionary and disruptive practices, whereby traders of certain social groups exclude others from participating. The emergence of specific clan-controlled market networks in southern Somalia and ethnic-based markets in Marsabit town, Kenya are graphic examples of this (see Little, 2003; Green et al., 2006).

Umar (2007) documents other cases of how trader-based networks affect CBT in the eastern Ethiopia/Somalia borderlands. He argues that the highly uncertain trade environment, due to political instability, conflict and random product confiscations by government officials, has created tightly structured clan-based trading corridors (networks) where products and agents are limited to a particular corridor. These corridors 'serve to protect but also to limit the volume and value of trade . . . each corridor is dominated by two or three large clans and managed by different sets of traders, guarantors and credit suppliers whose ties are clan-related and whose operations are founded on trust' (2007: 8).

On the positive side, 'trust'-based relations based on kinship and/or other social relations can serve important market and finance functions. In Ethiopia/Kenya transborder commerce, Mahmoud (2003) reports on the prevalence of loans between kin-based relations or between members of the same ethnic group in the Moyale–Nairobi trade. This may help to explain the predominance of strong ethnic-based trading coalitions in the area, where credit is often extended across considerable distances. In the absence of contracts and legal protections, this financial practice requires strong confidence that default and deception will not occur. Where trust-based networks exist, market transaction costs in CBT can be reduced because informal credit and market contracts are more easily extended without extensive oversight and formal agreements (see Ensminger, 1992: 104–5).

4 THE CASE OF LIVESTOCK-BASED CBT IN THE HORN OF AFRICA

International boundaries throughout the Horn of Africa have important economic and ecological characteristics that generally distinguish the region from other parts of Africa. For instance, the different borders separating the countries of Kenya, Ethiopia and Somalia are more than 2,500 km in length and traverse very insecure, remote zones. The incredible vastness of the region's borders makes administrative presence and controls very expensive.

Most of the borderlands are characterized by arid and semi-arid environments, mobile pastoral populations and chronic food deficits. The pastoral residents of the border areas are weakly integrated into most sectors of their countries and domestic market channels often provide inadequate outlets for their livestock and livestock products. The weak domestic market links also constrain the supply of food crops from surplus grain areas to deficit border zones, motivating consumers to purchase foods from unofficial cross-border markets (see Teka et al., 1999). Because most border markets are located far from national urban centres and markets, CBT can offer the best market option for residents.

Transborder trade in livestock is perhaps the most significant form of *clean* trade in the Horn. It dates to the pre-colonial period and the era of long-distance caravan trade (Dalleo, 1975). As a commodity, livestock has features that make it particularly amenable to CBT even in the poor security conditions typical of the Horn. Unlike many agricultural commodities, it is a living and mobile commodity that can be transported overland rather than on roads, and can easily be moved across borders. The fact that most of the commerce involves livestock trekking across borders means that a higher proportion of it is transacted via informal channels than trade in other agricultural products which often are trucked across borders. However, unlike other tradable commodities, animals are alive and require water and feed in transit, as well as veterinary care.

High Market Costs

High marketing and transport costs typify CBT in livestock. The vast distances that are covered by the CBT livestock routes in the Horn's borderlands partially explain why marketing costs might be so high. Table 7.1 shows the estimated costs of marketing a head of cattle along one of these trade routes – the southern Somalia/Kenya channel. As the data show, transport is the most important element of marketing costs and accounts for 47 per cent of total costs. This percentage is consistent with data for

Table 7.1 Trader marketing costs in Somalia/Kenya trade

Item	Amount US$ per cow	% total
Initial purchase price from herder	Varies	
Transport cost (to border)	3.00	6.0
Hired herd labour	1.60	3.2
Security/transit fees	0.40	0.8
Water	4.00	8.0
Medicine/dips	1.82	3.7
Fodder (Garissa market)	0.60	1.2
Broker fee (Afmadow)	1.25	2.5
Broker fee (Garissa)	1.67	3.3
Council tax (Kenya)	1.33	2.7
Currency transaction/conversion fees	5.28	10.6
Transport cost (Garissa/border–Nairobi)	20.15	40.5
Movement permit/fees	1.33	2.6
Hired labour	0.33	0.7
Water	1.00	2.0
Fodder (Garissa and Nairobi)	0.60	1.2
Market/municipal tax – Nairobi	1.33	2.7
Broker fee (Garissa)	1.67	3.3
Broker fee (Nairobi)	2.50	5.0
Total cost	49.86	100

livestock CBT elsewhere in Africa but, of course, it will vary based on distance (for a West African example, see Williams et al., 2006). Mahmoud, for example, calculates that for the southern Ethiopia/northern Kenya CBT, transport costs vary from 58 to 76 per cent of total marketing costs (2003: 152).

The trekking of animals at the lower end of the market chain characterizes virtually all of the key CBT livestock routes in the Horn. Usually there are three trekkers and an armed security person for every approximately 100 cattle moved by foot. Traders note that security risks are partly responsible for the increased transport costs, but also indicate that truck availability is a problem, especially along certain routes (see Mahmoud, 2003; Umar, 2007). Indications are that certain large traders and companies control transport along particular routes and limit the number of lorries involved. They monopolize the route and are known to restrict entry by outside entrepreneurs wishing to participate in the lucrative transport business.

As Table 7.1 demonstrates, traders incur other costs in CBT but they are generally small in comparison to transport. They must pay off a range of different actors, including middlemen and brokers, and cover the costs of taxes, water, fodder and veterinary inputs. While not reflected in the table, high bribe and corruption payments are also a major cost and in some areas can be a considerable marketing cost. Mahmoud shows that informal payments by livestock traders to police en route from the Kenya/Ethiopia border to Nairobi average 1,500 Ksh ($21) per truck load of cattle (2003: 154).

Most traders who are involved in the cross-border cattle trade utilize middlemen. Once a trader builds up a trust relationship with a middleman, the merchant is likely to stick with that individual. In contrast to earlier periods, it is now common for a Kenyan-based trader to receive price quotes by hand radio and telephone, including cell phones, and to adjust buying strategies accordingly.

Access to market information and buyers and sellers are costs that rural traders must address. Because official market information for livestock is virtually non-existent at the borders, traders rely on informal means of obtaining it. For instance, they often rely on local brokers (*dilaal*) for assistance. The broker's role is to match the buyer with a seller who often travels 100 km or more to the market, relay price information, and ensure the legitimacy of the sale. *Dilaal* work in the market on behalf of both buyers and sellers. They usually charge the equivalent of around 1 to 2 per cent of the price of the animal. In some cases, the fee is cut in half with both the buyer and seller paying part of the fee; in others the buyer and seller may be working with different brokers and will pay them separately. For the seller these arrangements remove the burden of finding a buyer and negotiating a price, as well as seeking out market information.

Trade Can be Very Seasonal

Livestock-based CBT in the Horn can be highly seasonal since animals have to be trekked, fed and watered. In dry seasons this can be major problem. For example, during the long dry season when surface water is unavailable virtually no cattle are moved to border markets in the Somalia/Kenya CBT. In this trade, water and grazing shortages show up as critical constraints identified by traders. There are well-known watering and grazing points along the main trekking routes, but rarely do transit herds stay long at any single place even during favourable seasons. Some locations do not have sufficient resources to support large numbers of cattle for more than a day or so, and most communities are reluctant to allow 'trade herds' to remain very long in an area. In the Somalia/Kenya CBT the goal is to move the animals as fast as possible to Kenya, and workdays of 10–12 hours, seven days a week, are the norm. Animals are usually moved no more than 15 km per day and then watered and grazed at the end of the day. In the long dry season, resource constraints make this impossible.

Herders who trek animals long distances to border markets are often forced to sell quickly. Without adequate holding grounds at markets, they usually cannot afford lengthy price negotiations, especially since their product (animal) is prone to losing weight and value. In a particularly harsh dry season or year this becomes an even larger problem and herders are forced to purchase riverine fodder from market vendors at relatively high prices. The lack of adequate holding spaces aids traders in price negotiations with CBT herders/middlemen who usually are desperate to sell after a day or two. Without alternative market options, they sadly end up being 'price takers' after trekking their animals such long distances.

The Importance of Informal Finance Arrangements

Transborder merchants rely on a range of different informal finance institutions in support of their businesses. When credit is used in cross-border commerce, more than 95 per cent of it is obtained informally from kinsmen, friends and associates (see Little, et al., 2001). Very few traders (less than 10 per cent of the total; Little, 2005) have access to formal sources of finance. Informal finance can supplement the lack of formal credit and, as noted above, trust-based relationships play an important role in these transactions. In the case of the Somalia border areas, informal financial services minimize risks associated with carrying large amounts of cash in an unstable environment. Somali border traders can take their earnings to Nairobi, convert them to dollars, and then 'wire' them back to money houses in Somalia, where they can be picked up by associates. This informal practice, called the *hawala* system (meaning 'transfer' in Arabic), avoids the need to carry large amounts of cash across the border. In other cases the trader will convert part of his earnings into tradable goods, which he will arrange with a wholesaler to be picked up at the border to avoid the risk of travelling in northeastern Kenya with excess money. These transfer services are mediated through informal money houses and middlemen, who assume special importance in most forms of long-distance trade, including livestock.

Informal financial arrangements associated with CBT are far more complex than originally envisaged. They entail issues of foreign exchange arbitrage; informal 'letters of credit' and wire transfers; use of revenues from livestock trade to cross-finance a range of imports, food and non-food; sophisticated market information and clientage relationships; and a variety of different social mechanisms to reduce transaction costs (see Little et al., 2001, 2005). In the region many of the important informal finance businesses that traders use have offices in Nairobi. The enterprises usually charge fees of 3–6 per cent to 'wire' funds from Kenya to locations in Somalia or Ethiopia; formal banks usually charge 10–12 per cent or more for the same service.

Evidence of Market Integration

Evidence of market integration for livestock CBT is mixed. Teka and Azeze, for example, note:

> Correlation results show that markets in eastern borderlands (Jijiga area) (Ethiopia) are integrated with cross-border markets in Somaliland. The results are found responsive to distance. Teka et al. (1999) have found that livestock markets in Borana area (southern borderlands, Ethiopia) are not integrated with markets in Kenya. (2002: 37)

However, when Teka and Azeze examine price data between different border market channels in the eastern Ethiopia region they find very weak spatial market integration. They find that 'the regression results show that there exists weak spatial integration between livestock market centers in the eastern borderlands' (ibid.: 40). These results, based on three years of market data, seem to confirm what Devereux (2006) and Umar (2007) found in their recent studies of livestock trade in the eastern Ethiopia/Somaliland borderlands. Markets seem to be better integrated within specific trading corridors but not between different trade corridors: 'price changes along one route do not appear to have an immediate effect on the prices along the rest of the routes' (Umar, 2007: 9). The explanation relates to the domination of specific clans and market operators in specific trade corridors: 'if the route used by a pastoralist or trader becomes inaccessible (for example, due to conflict or insecurity) or the market collapses (for example, during a drought, or because of government clampdown on contraband trade), there is often no alternative' (Devereux 2006: 52).

Studies of CBT in cereals and other food commodities seem to indicate better integration for these markets than for livestock markets. Although not based on the kind of systematic, longitudinal data described above, Nobera (1998) finds that cross-border food markets between Uganda and Kenya are well integrated. Where there are problems of market integration for food crops, Nobera points to 'poor road and communications infrastructure' (pp. 18–19) as culprits, rather than exclusionary trade practices as described for livestock CBT.

The results of the studies of CBT in the Horn confirm what was mentioned earlier about the key role of trader networks and how they can be highly exclusionary at times. The fact that these border regions experience high levels of political volatility, often resulting in conflict, intensifies the rigidity of these trade corridors and networks. This could help to explain why in certain CBT corridors Umar (2007) found a glut of animals unsold while there were shortages and higher prices at markets in other trade corridors. These findings also confirm what others have found for transborder trade in West Africa, 'where increasing competition between transborder trading networks has provoked recourse to various forms of informal protectionism' (Meagher, 2003: 67). There is much to be excited about in the endurance of CBT in the Horn of Africa despite political, economic and climatic instabilities, but some of these trade channels are marked by monopolistic characteristics, high barriers to entry, and excessive gains for merchants and transporters with only minimal benefits to producers. In fact, in most CBT routes herders receive less than 50 per cent of the final sale price (Little, 2005; McPeak et al., 2006).

5 CROSS-BORDER TRADE AND FOOD SECURITY

How does CBT in livestock contribute to food security in grain-deficit border areas? Why is cross-border trade so critical for understanding food security in the region? The simplest response to these queries is that income from CBT is used to subsidize grain consumption. Since purchases of foods in the borders' deficit zones account for a large part of household expenditures, especially for herders, increased food availability and reduced prices are beneficial outcomes. However, there are other ways in which CBT in livestock is critical for food security. Importantly the commerce complements, even finances, cross-border trade in grain and other food products. This has been documented along almost all CBT routes in the Horn region, including southern Sudan/northern Kenya and southern Sudan/northern Uganda (see Guvele and Lautze, 2000; and Muchomba and Sharp, 2006), southern Ethiopia/northern Kenya (Teka et al., 1999; Mahmoud, 2003), southern Somalia/northern Kenya (Little, 2000, 2006), eastern Ethiopia/Somaliland (Umar, 2007) and eastern Ethiopia/Djibouti (Teka and Azeze, 2002; Lawrence and Mohiddin, 2004). For example, livestock traders who sell their animals can purchase loads of grain and other foods to bring back across the border to sell in deficit areas. At times they may 'back haul' food using the same trucks. Umar found that about 25 per cent of livestock traders in the Ethiopia/Somalia/Kenya CBT were involved in selling staple foods, most of which were unofficially imported from Somalia and purchased with revenues from the livestock trade (Umar, 2007: 25).

Not only cattle, but food aid,[6] pasta, and electronics are supplied via CBT and find their way into neighbouring countries. During the occasional border closures of 2001–02, Kenyan merchants made it very clear that their businesses were strongly dependent on CBT with stateless Somalia (see Little, 2003; also see FSAU, 2003). Local shortages of key foodstuffs are not uncommon in the border regions when CBT in livestock slows down.

Cross-financing of Food Trade

In many parts of the Horn region the revenue earned from livestock-based CBT is used by merchants to finance the foodstuffs trade (see Little et al., 2001; FSAU, 2003). For example, in the Ethiopia/Somalia CBT the important role of cross-border financing (that is, using revenues from livestock trade to finance grain imports) has an enormous impact on food security in the region. Umar uses the concept of a 'conveyor belt' to explain how livestock and other types of trade complement each other in this region. He notes that 'the basic structure of the market is a simple set of parallel conveyor belts that take out livestock exports and bring in consumer goods' (2007: 8). He goes on to describe how the same ships arriving at Somali ports to pick up livestock also bring in imported foods. These imported foods are then moved back across the borders:

> Vessels (ships), returning to collect more export animals, come loaded with goods, such as food and household items that will be sold to the pastoralist producers. The trucks that ferried livestock to the port will load up with the return goods, completing the parallel conveyor belt connecting the ports with the pastoral towns and villages. (p. 41).

Umar's study of transborder trade also shows that the largest of the traders have their own companies (called *shirkad*) and export livestock to Saudi Arabia. They then use the revenues to import food, such as rice and wheat flour (ibid.: 28). According to Umar:

> *Shirkad* agents in Saudi Arabia send out *baggage* (household goods) and rations (bulk non-perishable food items like rice or wheat flour) as requested by the purchasing agents in the pastoralist areas. These purchasing agents have arrangements with a series of traders and shopkeepers. Due to the effects of the Saudi Arabian government ban on live imports from East Africa there were no *shirkad* operations in most of Somali Region throughout 2005. The *shirkad* of Somaliland will offer loans to traders to bring in cattle from Ethiopia. (p. 28)

Umar documents a case in March 2005 where more than 50 truckloads of imported foods (600+ tons of food) were confiscated by the Ethiopian government, resulting in rapid price inflation and the temporary closing of more than 50 per cent of local retail stores. After about three weeks the trucks were released, the retail stores reopened and prices stabilized (ibid.: 73–4).

In the late 1990s the slowdown in CBT in livestock, also due to an animal health-related import ban caused by fears of Rift Valley Fever, had similar effects on the food trade. For example, during the Saudi Arabia ban on livestock exports in 1998–99 it is estimated that cross-border commerce along the Somaliland/Ethiopia border was reduced by about 30 per cent (Steffen et al., 1998). This reduction meant that Ethiopian consumers on the other side of the border were adversely affected along two fronts: their livestock prices declined while prices of imported foods rose. In small rural areas key food commodities, such as rice and wheat flour, were either unavailable or accessible only at inflated prices (Ahrens, 1998). Because of the ban many large-scale animal traders, who were also major importers of food, pulled their operations out of eastern Ethiopia (Umar, 2007: 28).

Livestock–Grain Terms of Trade

Since many herders in the border regions finance imported food purchases through the sale of livestock, it is important to examine terms of trade indices between cereals and livestock prices. Unfortunately, residents at many border areas are spatially disadvantaged in two ways: they are at the bottom of both the livestock supply and food distribution chains where prices are low for livestock but high for foods. The terms of trade for livestock producers are worsened when CBT is disrupted. For example, herders suffered immensely when CBT in livestock and grain was halted because of the El Niño floods of the late 1990s and, more recently, 2006. Livestock sales equivalencies for maize, wheat flour and rice in southern Somalia declined 79, 53 and 61 per cent, respectively, during September to December 1997 (Little, 2001). Thus, a herder who sold a head of cattle in September 1997 could purchase 298 kg of maize, but in December the same animal fetched the equivalent of 64 kg. The poor market for livestock further damaged herder economies of the area and increased their vulnerability to food shortages and hunger.

In a different example, Table 7.2 shows what happened to animal exchange values at two border markets along the Ethiopia/Somalia border during a trade slowdown in the late 1990s which was caused by an animal health-related ban by Saudi Arabia (see Steffen et al., 1998). As the table shows, the terms of trade between livestock and food commodities worked against the herder at both markets. For a herder in the border market of Borama, a goat or sheep bought 79 kg of wheat flour in 1997, while it

Table 7.2 Exchange equivalencies between small stock (export quality) and foodstuffs in the Somalia/Ethiopian border markets, 1997–1998

Food item	Borama (kg)		Togwajale (kg)		Range of change (%)
	1997	1998	1997	1998	1997–1998
Maize	89	66	68	52	−21 to −26
Wheat flour	79	49	37	30	0 to −38
Rice	54	39	37	30	0 to −28
Sorghum	69	58	88	55	−15 to −38
Pasta	25	16	19	15	0 to −36

Source: Little (2003: 136).

purchased only 49 kg in 1998. Herders at Togwajale, which is most distant from Berbera port, suffered the worst terms for small stock sales, especially relative to imported foods. This town is located along the Ethiopian/Somalia border where prices for import foods are highest and livestock prices are lowest. In short, while the disruption of the CBT livestock trade impacted the entire region, it particularly affected locations along the border, which experienced the largest declines in small stock prices and the highest increases in the costs of imported foods.

If one looks at five-year trends in the terms of trade for herders in the same region, equally alarming concerns are raised (Table 7.3).

For the Ethiopia/Djibouti/Somalia triangle area, Teka and Azeze point out:

> For instance, in three selected markets of the Afar region (Ethiopia) near the Djibouti border the terms of trade between livestock and grain shows that there has been a consistent decline. The overall drop during five years was more than 80 percent. In other parts of eastern Ethiopia, the decline in the terms of trade has ranged from about 11 to 50 percent in Jijiga and Hartishiek to about 28 to 66 percent in Kebribeyah, eastern Ethiopia during the same five year period (1995–1999). Price data show that declines are higher for locally supplied maize than for rice, which is imported unofficially across the border. The problem is more severe in the Afar region where cross-border market access is limited in comparison to the Ethiopia–Somali region. (2002: 41–2)

More recent assessments show that the price trends for the western Djibouti border area have not improved much for Afar herders, who continue to see unfavourable terms of trade for their livestock *vis-à-vis*

Table 7.3 Terms of trade between livestock and grain in eastern Ethiopia borderlands (Jijiga area), 1995–1999

Markets	Livestock to grain	1995	1996	1997	1998	1999	Change 95 to 00 (%)
Jijiga Town	Male sheep to maize	93	77	98	92	50	−46.24
	Male goat to maize	76	67	79	69	38	−50.00
	Male sheep to rice	22	23	34	32	27	22.73
	Male goat to rice	18	20	27	24	20	11.11
Kebribeyah	Male sheep to maize	130	116	115	67	44	−66.15
	Male goat to maize	114	99	98	60	40	−64.91
	Male sheep to rice	40	33	35	26	27	−32.50
	Male goat to rice	35	28	30	24	25	−28.57
Hartishiek	Male sheep to maize	96	94	104	55	50	−47.92
	Male goat to maize	89	82	86	46	45	−49.44
	Male sheep to rice	45	40	47	32	40	−11.11
	Male goat to rice	42	35	39	26	36	−14.29

Note: Values are in kilograms of the specified grain.

Source: Teka and Azeze (2002: 42).

grain prices (Lawrence and Mohiddin, 2004). In the nearby Somali region of eastern Ethiopia, in turn, Umar shows that while livestock prices rebounded slightly in the 2002–03 period, recent disruptions to CBT still result in lower livestock prices relative to food prices. As he notes, 'ensuring a stable supply of imported food grains into the region is crucial to reducing the vulnerability of pastoral livelihoods' (2007: 76). Similar findings are also echoed in a 2003 report on the southern Somali borderlands (see FSAU, 2003). In this area, 'proceeds from cattle trade are used to pay for imported commodities' and the closure of CBT in cattle 'has seriously curtailed traders' ability to bring imported commodities into rural markets' (ibid.: 5). The net result has been steep increases in food prices but sharp declines in cattle prices.

6 POLICY IMPLICATIONS AND CONCLUSIONS

The preceding discussion has shown the scale, complexity and vital role of CBT in the economies and societies of Eastern Africa, with a focus on the Horn region. Nonetheless, the activity still suffers from policy ambiguities, misunderstandings, and an unwarranted concern that the trade's 'informality' encourages trade in illegal goods and a major loss of public revenues. This final section summarizes the chapter's major findings in terms of their policy implications and challenges.

Scarcity of Information for Policy Making

Contemporary CBT in many parts of Eastern Africa is not captured by government statistics, despite important recent efforts by regional groups and projects to collect market data at key border points (see WFP/FEWSNET, 2006; and Regional Agricultural Trade Intelligence Network (RATIN) project). Notwithstanding important recent initiatives, available government information still contains only vague estimates of the trade's importance. This shortcoming hampers constructive policy dialogue and results in self-perpetuating stereotypes and misinterpretations. In short, CBT remains largely 'below the radar' for many policy makers and economic planners.

Until very recently most data on informal cross-border trade derived from case studies of limited geographic scope and/or anecdotal estimates and observations from brief field missions. Since 2004 some systematic market data have been collected at key border markets in Southern and Eastern Africa with support from regional and international organizations (see above discussion and WFP/FEWSNET, 2004 and 2006). However, coverage of CBT in livestock remains minimal. Market information systems should be expanded to include coverage of CBT, so that policy can be informed by reliable data.

Trader Perceptions

An important source of policy-relevant information about CBT should come from the main actors themselves, the traders. This is almost never the case. Morris and Dadson's work (2000) in Ghana's borderlands and Little's (2001) study in northern Kenya's border areas suggest ways in which information from groups of traders can be used to generate policy-relevant data. In the Horn of Africa different studies of traders' perceptions of CBT reveal several key policy-related issues. Most of the points have to do with insecurity, lack of markets, the role of the government in 'policing' and taxing CBT, and a lack of infrastructure and credit.

Table 7.4 shows the main concerns expressed by traders involved with the Somalia/Kenya (S/K) and Ethiopia/Kenya (E/K) border trade. The data highlight important and surprising differences. For instance, when traders were asked to identify their major concerns about CBT, insecurity

Table 7.4 Major concerns expressed by traders (% of traders who identified different concerns)

Problem type	Kenya/Somalia border traders (%)	Kenya/Ethiopia border traders (%)
Insecurity	19.5	32.5
Transport related	11.0	25.0
Pasture/water	17.0	13.5
Market related (low prices, excessive competition, etc.)	24.0	6.5
Loan/credit problems	7.0	12.5
Fees/taxes (incl. bribes)	3.5	9.5
Other	8.0	0
Total (rounded)	100	100

Sources: Little (2003: 126); Mahmoud (2003: 160); Little and Mahmoud (2005: 2).

showed up as important in both markets but for different reasons (insecurity was also a major constraint identified by CBT traders elsewhere in the region; see Nobera, 1998; Muchomba and Sharp, 2006). Surprisingly, it was identified as more of a problem in the E/K than in the S/K commerce, despite the latter's common association with excessive conflict and political instability. In the S/K trade, security risks are associated with intermediate market levels between Somalia and Kenya's border markets, but most risks are found elsewhere in the E/K commerce. The risks in the E/K activity mainly include violence along the Moyale/Isiolo road, cash losses at the Nairobi market, and insecurity on the trekking routes between the border and terminal markets.

Credit problems are issues in both the S/K and E/K markets but assume greater magnitude in the latter commerce. Virtually all traders from northern and northeastern Kenya sell their animals on credit/consignment to the large meat wholesalers in Nairobi. In a survey of 35 E/K traders in 2001–02, the average amount of credit owed to them from Nairobi wholesalers was US$2,992 (Mahmoud, 2003: 201). The institutional response to these credit and payment risks has been the emergence of partnerships to facilitate the collection of Nairobi debts, as well as improved flows of market information between Nairobi and the border (see Mahmoud, 2003; Little and Mahmoud, 2005). One of the partners remains almost full-time in the Nairobi market to secure sales and ensure collection of payments.

A comparison of Table 7.4 with what Umar (2007) found in his study of CBT reveal some interesting differences and parallels. Umar's study shows the main concerns of eastern Ethiopian traders to be (in order of importance): (i) lack of markets; (ii) low profitability; (iii) harassment by government; (iv) low prices; and (v) the animal import ban imposed by Saudi Arabia (Umar, 2007: 78). Interestingly, insecurity showed up as a relatively minor concern of eastern Ethiopian traders (identified by about 7 per cent of traders). With recent confiscations of trade goods by government officials and the imposition of the Somali currency ban discussed earlier, it is not surprising that government harassment showed up as an important issue (identified by 16 per cent of traders), as well as market problems and trader profitability (24 per cent of traders). Strong market-related concerns were expressed in all three of the border regions and this probably stems from trade disruptions caused by the Saudi ban on animal imports and by random government confiscations. However, market disruptions to CBT have been considerably more severe in the eastern Ethiopian/Somalia trade than in other trade channels in the region.

Administrative and Legal Ambiguities

There is a great deal of uncertainty about existing policies towards CBT; about what level of administration is responsible for regulating/licensing the activity; and about the rights of CBT traders to engage in trade of legal goods. Efforts to counter these shortcomings and establish more formal policies toward CBT, especially for maize trade, seem to be further advanced in Southern than in Eastern Africa. To exploit the potential of a free trade zone in the region, COMESA (Common Market for Eastern and Southern Africa) has endorsed the so-called 'Maize without Borders' initiative and has reviewed 'customs documentation and procedures with a view to simplifying and facilitating cross-border maize trade' (Miti, 2005: 7). Both Uganda and Ethiopia have also tried to simplify CBT issues by 'decentralizing' permit administration to local levels and allowing small traders to practise informal CBT up to a certain value (more than $1,000 per month in Uganda's case) but even here considerable confusion remains (see Nobera, 1998; Teka and Azeze, 2002). As Devereux (2006) points out for eastern Ethiopia, regional and local authorities in eastern Ethiopia often are unaware of policy changes at the federal level and, thus, some local actions may actually contradict existing laws and policies. In the case of livestock, there is even more ambiguity in Ethiopia after the legalization of small volumes of cross-border trade (eight head of small stock or less per trip). In the Horn region where some CBT restrictions have been eased, the amount of paperwork and time required to qualify under new regulations is so cumbersome that most traders do not bother with it.

Additional factors that increase policy uncertainties surrounding CBT are concerns about (i) illegal arms trade/terrorism and (ii) potential competition with domestic industries. Unfortunately, politically charged arguments for controlling borders also have an impact on the food trade.

CBT in foodstuffs and livestock also can become embroiled in larger trade issues that include re-exports of manufactured goods and electronics (see Nobera, 1998: 35). Re-exports of textiles and 'used clothes' across borders have been of special concern to national policy makers in the region. The conflation of different products and types of CBT has hurt policy discussions as governments want to protect domestic industries against cheap Asian imports. Because states also rely on official exports to earn foreign exchange, they also want to halt CBT since they perceive it as a source of lost public revenue.[7] Occasional punitive actions against livestock traders by governments in the Horn can be linked to these larger issues. Thus, despite its importance governments usually only appreciate and acknowledge the illegal dimension of cross-border trade and, when they act, their normal response is to penalize it.

Improve Infrastructure, Security and Communications

As noted earlier, roads and transport facilities are generally lacking to/from many border markets, as are most other important infrastructure in the area. Earlier work has shown that the lack of infrastructure greatly increases transaction costs and inefficiencies, and inadequate communication facilities leads to poor dissemination of market information (Nobera, 1998; Little et al., 2001). Studies in the region show that road improvement in some border areas can increase volumes of CBT and reduce marketing costs (see Little, 2005).

As noted frequently in this chapter, insecurity is also a strong impediment to CBT, resulting in banditry, violence and the attraction of criminal elements into the trade. Some observers argue that insecurity is the single largest constraint to CBT in Eastern Africa and should be a key focus of policy makers (Nobera, 1998: 48). Indeed, it can greatly distort markets and significantly reduce incomes for the poorest populations of the region, especially pastoralists. Without improved security and public infrastructure, merchants may be reluctant to invest in CBT and supportive facilities and assets.

To conclude, policies that acknowledge and encourage, rather than discourage, regional CBT can capitalize on comparative advantage for different locales, strengthen local food security, increase collection of state revenues and investments in key market and transport infrastructure, and reduce price volatility and market imperfections. By recognizing the importance of CBT rather than discouraging it, governments could greatly expand their own revenues through customs and tax collection at borders and market towns, and improve the welfare of their citizens at the same time.

NOTES

1. Throughout the chapter CBT refers to informal or unofficial cross-border trade unless noted otherwise.
2. In contrast, Morris and Dadson (2000:19) argue that increased liberalization has been successful in channelling CBT into formal channels in the case of Ghana.
3. I use the term 'clean' for trade in relatively benign commodities like cattle or grains, in order to distinguish it from other transborder trade in 'dirty' goods, like drugs and arms.
4. These notes are from interviews conducted by Alemayehu Azeze during initial fieldwork for the 'Cross-border Trade and Food Security in the Horn of Africa' project (see Little et al., 2001).
5. Nobera also notes that the eastern Congo and southern Sudan economies are so integrated with Uganda and dependent on products informally imported from Uganda that the Uganda shilling is widely used in these areas (1998: 26).
6. The leakage of food aid across borders in the Horn region is a well-known phenomenon, and it moves in different directions depending on price, availability and ease of movement. In the Great Lakes region of Eastern Africa CBT in food aid is noted to be particularly important and many key international food relief agencies source their supplies from CBT markets (see Nobera, 1998).
7. Official attitudes towards CBT can also change during periods of drought and national food shortages. As Nobera points out, 'Tanzania also imposes a ban on food exports every time it has a food crisis' (1998: 12; also see FEWSNET, 2002).

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8. Regional trade and food security: recent evidence from Zambia*

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1 INTRODUCTION

Maize, Africa's number one food staple, provides over half of all calories consumed in Zambia. Yet dependence on rainfed maize production leads to highly volatile output from one year to the next, in Zambia as in many parts of Sub-Saharan Africa. Given the erratic rainfall, and with less than 5 per cent of cropped land under irrigation, Zambia's maize crop fails to satisfy national consumption requirements in one year out of three on average. In good harvest years, Zambia produces a maize surplus, enabling the country to export maize. In bad years, when drought, reduced planting area, or input supply bottlenecks constrict output, Zambia imports maize. Given this pronounced production volatility, trade becomes a valuable tool for stabilizing national food supplies.

Yet, in much of Africa, governments mistrust traders. Policy makers fear a loss of government control over maize supplies and the politically sensitive maize price. They fear that collusion by traders may lead to market manipulation and profiteering that could, in turn, lead to politically damaging food shortages and price spikes. As a result, in recent years, Zambia's default policy has been to restrict private sector cross-border maize flows. Following the deficit harvest of 2005, the Zambian government restricted maize imports. And following successive good harvests, in 2006 and 2007, the government has tightly controlled exports.[2]

The mistrust is mutual. In part, traders have difficulty anticipating what government will actually do. During the first half of 2007, the government position on maize exports changed three times (Chalu, 2007; Malan, 2007; Times, 2007; Zinyama, 2007; ZNFU, 2007). In deficit years, given strong

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political pressure to subsidize government-sponsored maize imports, private traders are reluctant to bring in commercial grain, which they would then be able to sell only at a loss. Zambian traders remember the risks they incurred under these conditions in both 2000/01 and 2005/06 (Nijhoff et al., 2003; Mwanaumo et al., 2005). Uncertainty about government intentions, coupled with the fear of being undercut by subsidized public sales, induces private grain traders to remain on the sidelines or to limit their exposure by bringing in only small lots. In response, governments complain that they cannot rely on the private sector to import adequate quantities of food in times of need. Where private traders and African governments fail to solve staple food supply problems themselves, food aid donors stand ready to fill the gap.

Currently, three sets of actors, with three sets of tools, stand willing to help buffer maize shortfalls and surpluses. Private traders lobby actively for unrestrained cross-border trade as a means of moderating domestic surpluses and deficits. Governments, however, often prefer direct public import or export by parastatal food agencies such as Zambia's Food Reserve Agency (FRA) or Malawi's National Food Reserve Agency (NFRA). Food aid agencies, together with governments, estimate potential supply gaps that need to be filled by public or food aid imports. In surplus years, governments favour local procurement by public grain marketing agencies as a means of supporting farm prices. Simultaneously, some donors conduct local procurement for export to neighbouring deficit countries or refugee camps. The food aid agencies likewise closely monitor within-country variations in food availability, prices and income and stand willing to provide targeted food or income support to vulnerable groups. All three groups respond in related ways to the pressures and opportunities created by intermittent maize supply shocks.

Where these three actors cooperate and interact, their actions can prove complementary. However, where they misjudge or mistrust each other, one or another may overreact, potentially aggravating both price volatility and swings in food availability. During the drought of 2002/03, for example, the Malawian government failed to anticipate the roughly 200,000 tonnes of private sector maize imports from northern Mozambique, attracted by high maize prices in drought-stricken Malawi. This miscalculation led to excessive public imports, subsequent sales to unload surplus public stocks, government financial losses, and depressed maize prices both during the lean season and early in the following harvest season (Whiteside, 2003; Tschirley et al., 2004). In addition to dampening incentives for Malawian farmers, this overshooting on public and food aid imports discouraged seasonal private sector storage and reduced incentives for Mozambican farmers to produce for the Malawian market in future years. Clearly, each set of actors needs to anticipate accurately the actions of the others.

In deficit years, all three groups must assess the potential need for imports. Traders need to assess import requirements quickly in order to lock in regional maize supply contracts and transport. Aid agencies and governments must likewise take decisions on required volumes of food aid quickly, without the benefit of time-consuming, data-intensive analysis, given the urgent needs of food-insecure populations during emergency situations. Like the private sector, government and food aid agencies would benefit from a simple tool for assessing the likely impact of weather-induced supply shocks on maize production, prices, consumption and trade flows.

This chapter presents a simple economic model developed to help government, the private sector and food aid agencies[3] to quickly assess the likely impact of production shocks on domestic maize prices, incentives for private sector imports, national food availability and consumption of vulnerable groups. The model aims to predict the potential responsiveness and impact of private trade as well as the likely consequences of food aid, public procurement and other common policy interventions. Section 2 sets the stage by describing the staple food economy of Zambia. Section 3 then presents the analytical framework used to examine the impact of year-to-year production fluctuations as well as the consequences of potential private and public sector responses. Sections 4 and 5 illustrate how public policy makers, food aid donors and the private sector can apply this framework to assess the effectiveness of various private and public responses during both a drought year and a bumper harvest year. Section 5 also describes a specific application of the model when, at the request of the Zambian Grain Traders' Association, the authors used this model to estimate the likely impact of alternative export quotas during stakeholder discussions of Zambia's 2006 maize export controls. Section 6 reviews a sensitivity analysis of the results, while Section 7 concludes by summarizing key policy and operational implications.

2 THE ZAMBIAN FOOD ECONOMY

Production of Staple Foods

Maize accounts for 60 per cent of national calorie consumption and serves as the dietary mainstay in central, southern and eastern Zambia. Because rainfed smallholder farms account for over two-thirds of national maize production, under erratic rainfall conditions, maize output has proven highly volatile over time. Amid this wide year-to-year variation, maize production has trended downwards in Zambia since the early 1990s, following marketing reforms and the withdrawal of large-scale maize subsidies. The abandonment of large-scale government procurement and pan-territorial pricing has reduced price incentives for maize cultivation, particularly in more remote areas. Consequently farmers have reduced the area devoted to maize production and diversified into other food staples and export crops such as cotton, tobacco and paprika (Jayne et al., 2007).

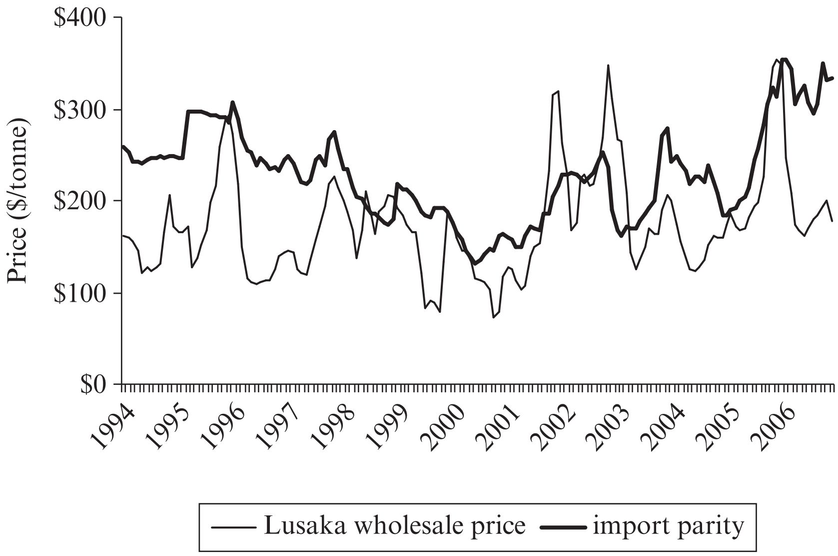
Cassava, the nation's second largest source of calories, accounts for roughly 15 per cent of national calorie consumption. Production has grown rapidly since the early 1990s, when government breeders released their first wave of highly productive new cassava varieties. Cassava serves as the principle staple in northern Zambia and is widely grown in western Zambia, where the Lozi people consume a diversified diet of rice, cassava, sorghum and maize. Production of sweet potatoes, though not well captured in national food balance sheets, has likewise grown rapidly over the past decade, following the release of several new cultivars by Zambia's Root and Tuber Improvement Programme. Sorghum and millet, widely grown minor crops, supplement diets in southern, western, northern and central Zambia. While Zambia's predominantly rainfed maize crop proves highly susceptible to drought, diversification into alternative staples such as cassava, sweet potatoes, sorghum and millet has moderated this volatility by expanding the country's portfolio of drought-resistant alternative foods.

Prices

Over the past decade and a half, as maize production has stalled, import prices of maize have become increasingly competitive with domestic production, leading to steadily improving incentives for private commercial maize imports during years of domestic production shortfall (Figure 8.1). Zambia's maize imports come primarily from South Africa, though in some seasons the country has imported maize from southern Tanzania and even as far away as Uganda.

Domestic Food Policies

Historically, Zambia's governments have intervened heavily in maize markets, at least since the 1930s. Before independence, in 1964, maize pricing policies favoured commercial white farmers (Wood et al., 1990). But since independence, policies have favoured smallholders. While government-supported cooperatives and lending institutions supplied subsidized inputs of fertilizer and seeds to smallholder farmers, government's



Sources: Agricultural Marketing Information Centre (AMIC); CHC Commodities monthly reports; South African Commodity Exchange (SAFEX).

Figure 8.1 Trends in import parity and domestic white maize prices

agricultural marketing parastatal, NAMBOARD (National Agricultural Marketing Board), provided a guaranteed market, purchasing maize at a fixed pan-territorial price. At the same time, they subsidized urban consumers by controlling the price of maize meal. Through the NAMBOARD monopoly and strict foreign exchange regulations, government controlled maize imports and exports as well as the price and volumes traded on the domestic market. During Zambia's second republic, President Kenneth Kaunda nationalized the large maize mills in order to directly control urban maize meal prices. At their peak in 1986, consumer and producer maize subsidies accounted for 17 per cent of total government spending (Howard and Mungoma, 1996). Ultimately, these heavy subsidies proved unsustainable, as copper prices plummeted and large losses in other parastatals paralysed government finances, forcing a broad liberalization of economic policy (Hill and McPherson, 2004).

Liberalization of Zambia's maize markets has occurred more slowly than in other sectors of the economy. Early efforts to reduce urban maize subsidies, in 1986 and 1990, led to riots in the Copperbelt and Lusaka. As a result, Zambian political leaders remain acutely aware of the political sensitivity of maize policy. This has led to a hesitation waltz of partial reforms, periodic backtracking and intermittent inconsistencies between stated policy and actual implementation (see Mwanaumo, 1994 and 1999; Howard and Mungoma, 1996; Jayne et al., 1999; Nijhoff et al., 2002 and 2003). After campaigning on a platform of maize market reform, the newly installed Chiluba government began its reform efforts in 1991 by dismantling NAMBOARD and issuing licences to private maize traders. But the halving of national maize production during the drought of 1992 led to immediate pressures to resume heavy government involvement in both import and domestic marketing. Not until the 1994/95 production season did government refrain from announcing maize prices (Howard and Mungoma, 1996). After having dismantled NAMBOARD in 1991, government established a new FRA in 1995 to maintain security stocks. FRA purchases remained nominal until the early 2000s when they ranged between 50 and 75 thousand tonnes per year. In 2006, a presidential election year, the FRA purchased roughly 400 thousand tonnes of maize, controlling the majority of traded maize and becoming overwhelmingly the largest trader in the market.

Trade Policy

Even after liberalization of domestic trade, the government has continued to play an active role in influencing the level of maize imports and exports. It has, at various times, imported directly, influenced the levels of food aid imports and issued publicly financed tenders for private import, in many cases for sale to privatized mills at subsidized prices. This public involvement has resulted in significant quantities of maize imports during the 1990s and 2000s, even when price differentials would not have made purely commercial imports viable (see Table 8.1 and Figure 8.1).

This active government involvement, coupled with unpredictable policy positions, has tended to discourage commercial cross-border maize trade. In response to the 2001/02 drought, the government announced its intention to tender for the import of 200 thousand tonnes of maize and to sell that grain at subsidized prices through selected large millers. Due to delayed financing for these government-sponsored imports, however, actual shipments did not begin until December, and by May 2002 only 130 thousand tonnes had arrived. Under the government subsidy, 16 designated millers sold the imported grain at \$70 to \$100 below market price. As a result, private traders declined to import maize at commercial prices for fear of losing money (Nijhoff et al., 2002, 2003).

In recent years, Zambia's policies have similarly restricted external trade flows. In the calendar year 2005, a year of below-normal maize harvest, the government initially refused to authorize maize imports. Following

Table 8.1 Historical maize production and price movements in Zambia

Year	Harvest	Production (tonnes)	Price*		Maize imports			Maize exports
			$/tonne	% change	Non-aid	Food aid	Total	
1990	Good	1,092,671	a.d.		100,000	13,388	113,388	14,119
1991	Good	1,095,908	a.d.		42,000	338,360	380,360	300
1992	Bad	483,492	a.d.		172,990	507,010	680,000	115
1993	Excellent	1,597,767	a.d.		312,640	3,360	316,000	7,032
1994	Good	1,020,749	$150		10,061	3,400	13,461	1,100
1995	Moderate	737,835	$208		41,406	60,815	102,221	2,950
1996	Excellent	1,409,485	$127		36,794	3,206	40,000	140
1997	Moderate	960,188	$173		50,073	2,324	52,397	6,975
1998	Bad	638,134	$183		380,237	34,763	415,000	100
1999	Moderate	822,056	$135		14,410	18,026	32,436	8,277
2000	Moderate	881,555	$116		3,741	1,740	5,481	14,189
2001	Bad	601,606	$192		10,334	57,412	67,746	11,726
2002	Bad	602,000	$244		195,526	73,575	269,101	4,885
2003	Good	1,161,000	$169		115,955	44,999	160,954	629
2004	Good	1,113,916	$150		6,223	20,000	26,223	103,245
2005	Moderate	866,187	$236		50,000	70,000	120,000	10,000

Averages, 1990–2005								
	Excellent	1,409,485	$127	−27%	174,717	3,283	178,000	3,586
	Good	1,098,555	$156	−10%	115,364	84,021	199,385	25,065
	Moderate	853,564	$174	0%	31,926	30,581	62,507	8,478
	Bad	613,913	$206	19%	189,772	168,190	357,962	4,207
Baseline	Good to moderate	945,436	$167		73,645	57,301	130,946	16,772

Notes:
* Lusaka into-mill wholesale price for the marketing year, May–April.
a.d. = administratively determined.

Sources: Ministry of Agriculture and Cooperatives (MACO), Agricultural Marketing Information Centre (AMIC) and FAOSTAT.

heavy lobbying by millers and traders, the Ministry of Agriculture and Cooperatives (MACO) issued import permits for 200 thousand tonnes of maize, 150 thousand to the private sector and 50 thousand through the FRA. Government suspension of early shipments, under new GMO (genetically modified organism) certification procedures, and confusion over maize import duties (which government initially increased and subsequently suspended temporarily), produced considerable uncertainty among potential private importers. Subsidized sales of FRA maize stocks to millers, late in the year at \$60 to \$80 below import parity, introduced considerable risks for private traders as well as disincentives for millers looking to import maize. The resulting confusion and disincentives limited actual imports to less than half the allocated quota and delayed them until very late in the marketing season when import prices had risen by over \$90 per tonne (Mwanaumo et al., 2005).

The following season, Zambian farmers produced a bumper maize crop. Even so, the government order restricting cross-border maize flows remained in effect, preventing maize exports. As domestic maize prices fell, traders and farmers lobbied for permission to export while, in the midst of a presidential election campaign, the FRA purchased over 400 thousand tonnes of maize (Fynn, 2007). Ultimately, the government authorized the export of 200 thousand tonnes through the FRA.

In the 2007 harvest season, early flooding led to concerns about potential crop shortages. But as the season unfolded, the damage proved highly localized, and Zambia produced a bumper harvest of 1.4 million tonnes of maize. Early government statements suggesting that they would allow maize and maize meal exports (Zinyama, 2007) gave way to a series of abrupt changes – reimposition of an export ban in mid-March (Times, 2007), a temporary lifting of the export restrictions in late March, along with a statement reiterating the government's commitment to maintain the export ban (Malan, 2007), and finally, in June of 2007, the issuance of export permits for 200 thousand tonnes of maize, 50 thousand through the FRA and 50 thousand each through farmers, millers and traders (ZNFU, 2007).

Given the unpredictability of government behaviour and the constant risk of subsidized public maize sales, many private traders and millers have proved reluctant to engage in commercial cross-border maize trade. In fact, several large players have exited the industry. During the 1990s, after maize market liberalization began, five international grain trading companies opened offices in Zambia. But four of the five subsequently closed their Zambian operations because of the unpredictability of government actions and the consequently high risk of commercial losses (Nijhoff et al., 2003).

Food Aid

Potential food aid flows likewise affect trader incentives, food supply, prices and ultimately consumption. Each season, government and food aid agencies jointly assess potential needs for emergency food relief. These assessments typically compute a simple supply gap between domestic supply and a target consumption level that takes little account of price adjustments by traders or consumers. Without a simple method for assessing potential volumes of private sector imports or consumer shifts into alternative foods, these estimates normally overstate food aid requirements. In the short run, this can result in excessive food aid imports and high financial costs. In the medium term, outsized public food imports discourage private traders and dampen incentives for farm production as well as private sector storage and trade.

Food aid agencies recognize that they would benefit from a simple tool for assessing the likely impact of weather-induced supply shocks on maize production, prices, consumption and trade flows. In response to a specific request from one major food aid donor, we have developed the following simple model.[4]

3 ANALYTICAL FRAMEWORK

Objectives

Based on our interactions with the Zambian government, private sector and food aid agencies, we considered two sets of criteria in formulating this analytical framework. To be meaningful, the framework needs to estimate the price consequences of a production shock as well as key price responses by consumers, traders and farmers. To be feasible, the framework must be simple to use, easy to understand and, once baseline data are assembled, parsimonious in data inputs required.

The simple model proposed here differs from standard methods used in government food aid needs assessments primarily through its explicit modelling of market prices for key staple foods (maize and cassava) and the resulting impact of price changes on farm household income, food consumption by various household groups, staple food imports and exports, and next season's production. To anticipate these multiple outcomes, the framework incorporates price responses by three key groups: poor consumers, who reduce maize consumption and increase consumption of alternative staples as maize price rises; traders and millers, who import and export in response to differentials between domestic and border prices; and farmers, who alter planting decisions in response to changing prices.

Policy Instruments

As exogenous variables, the model includes a range of potential instruments wielded by government and donors. These include trade quotas, tariffs, public imports, government exports, local procurement, government stockholding and sales, and targeted income transfers to vulnerable groups.

Model Structure

At its core, the model estimates how much the domestic maize price will change following an exogenous shock – a drought, flood or pest infestation affecting farm production; a change in world prices; public food imports; food aid; or an array of government policy changes. Changes in maize output and price, in turn, affect the income of maize-producing households as well as consumption decisions of all household groups. With even a rudimentary knowledge of the price elasticity of demand, the model is able to estimate approximate orders of magnitude for the resulting shift in market price, by tracing out individual and aggregate demand curves for maize.

When the domestic maize price lies between import and export parity, no trade takes place and the domestic price prevails. But when the domestic maize price spikes, import parity sets an upper limit on the price rise. Conversely, in years of bumper maize harvest, when domestic prices plunge, export parity price sets a floor price below which the domestic price will not fall.

To capture key consumption responses to a price shock, the model includes Zambia's two principal food staples, maize and cassava. In the event of a drought, the maize price rises and consumers reduce their consumption of maize. At the same time, they reorientate consumption towards more readily available, typically more drought-tolerant staple foods such as cassava, sweet potatoes, millet and sorghum.

In addition to its scale, cassava offers another important property, a perfectly elastic supply in the short run. Farmers plant cassava in one season and can harvest the starchy roots any time from 18 months to three years after planting. The energy reserves in the roots enable the cassava plant to survive severe drought and to store food in situ in farmers' fields for up to three years. So in the event of a precipitous fall in maize availability, farmers can simply harvest more cassava than they would have otherwise and free up maize for sale or for consumption by others. For this reason, consumption of both maize and cassava respond to changes in the maize price.

The model considers responses by 10 different household groups. It partitions households geographically, splitting the heavy cassava-consuming regions of the north from the primarily maize-consuming regions of the south. Within each geographic region, the model distinguishes urban from rural households, maize producers from non-producer households, and three groups of vulnerable households: deficit farm households, rural non-farm households and the urban poor.

Appendix 8A1 describes the model formally, while Tables 8.2 and 8.3 detail the baseline data and model parameters. Appendix 8A2 describes how we have estimated the model parameters by using available secondary data combined with our own estimates of demand parameters for each household group using the 1998 Living Conditions Monitoring Survey (LCMS), the most recent national household consumption survey available from Zambia's Central Statistical Office (CSO).[5] Given the importance of the price elasticities in determining actual projections, we have conducted sensitivity analysis under a range of plausible parameter values.

Baseline Data

The following simulations trace changes from a base maize production of 945 thousand tonnes, the average level achieved during the eight moderate to good harvests since 1994. Although necessarily arbitrary, we have selected this period since it provides a recent, relatively long (12-year) period for which both production and seasonal price data are available. The domestic into-mill maize price during these years averaged \$167 per tonne. Given normal seasonal price movements, this results in a lean season (January–March) price of \$198 per tonne.

Regular publicly sponsored maize imports during the 1990s and 2000s, often released on the domestic market at subsidized prices, increased maize availability and depressed domestic maize prices below levels that would have prevailed in a fully liberalized market. To estimate a market equilibrium as the baseline price, the first simulation estimates what market price would have prevailed in the absence of these subsidized public imports. Doing so, the model projects that the lean season maize price would have been approximately \$229 per tonne, or kwacha 914 per kilogram. These results suggest that the publicly sponsored imports of roughly 50 thousand tonnes per year depressed domestic maize prices by roughly 13 per cent from the mid-1990s through the mid-2000s (Table 8.4, columns a and b).

The base scenario computes an import parity price based on delivery

Table 8.2 Household baseline data

Household group*	Population		Income per capita ($)	Maize consumption			Cassava consumption			Production share (%)	
	Thousands	Share (%)		kg/capita	000 tonnes	National share (%)	kg/capita* (dry)	000 tonnes (fresh)	National share (%)	Maize	Cassava
Northern Zambia											
Commercial farms	899,213	8.1	1,394.99	135	122	13.5	105	315	33.2	14.3	36.4
Poor farms	2,323,917	20.8	336.79	43	99	11.0	62	482	50.8	15.5	59.4
Rural non-farm	352	3.2	336.79	43	15	1.7	62	73	7.7	0.0	0.0
Middle and rich urban	893,125	8.0	2,286.92	114	102	11.3	8	23	2.4	1.5	1.5
Urban poor	452	4.1	519.71	64	38	4.2	8	16	1.6	0.8	1.4
Southern Zambia											
Commercial farms	1,245,304	11.2	1,533.56	136	170	18.8	4	15	1.5	30.2	0.2
Poor farms	3,218,350	28.9	335.69	68	219	24.3	2	16	1.7	36.1	0.8
Rural non-farm	488	4.4	335.69	68	33	3.7	2	2	0.3	0.0	0.0
Middle and rich urban	678,672	6.1	2,324.03	115	78	8.7	2	5	0.5	0.8	0.1
Urban poor	452	4.1	520.75	56	25	2.8	2	3	0.3	0.9	0.2
Total	9,260,325	100.0	850.00	81	901	100.0	26	950	100.0	100.0	100.0

Note: * Northern Zambia encompasses all of Agro-Ecological zone 3, which corresponds roughly to Northern, Luapula, Copperbelt, Northwest and Western Provinces. Southern Zambia includes Agro-Ecological Zones 1 and 2, which encompasses most of Central, Southern and Eastern Provinces.

Sources: 2002 Zambia Social Accounting Matrix; 2000 population census; Post-Harvest Survey 2002/03; household consumption survey of 1998.

Table 8.3 Model parameters

Household group*		Price elasticity of demand				Expenditure elasticity of demand	
	for:	Maize		Cassava			
	wrt price of:	Maize	Cassava	Maize	Cassava	EDY_M	EDY_C
Northern Zambia							
Commercial farms		−0.30	0	−0.10	0.10	0.80	2.90
Poor farms		−0.50	0	−0.20	0.20	1.65	0.50
Rural non-farm		−0.50	0	−0.20	0.20	1.80	0.60
Middle and rich urban		−0.40	0	−0.20	0.20	0.75	−0.40
Urban poor		−0.40	0	−0.20	0.20	0.65	−0.30
Southern Zambia							
Commercial farms		−0.38	0	−0.10	0.10	0.87	0.35
Poor farms		−0.30	0	−0.20	0.20	0.65	0.50
Rural non-farm		−0.30	0	−0.20	0.20	0.70	0.60
Middle and rich urban		−0.10	0	−0.20	0.20	0.20	−0.40
Urban poor		−0.20	0	−0.20	0.20	0.30	−0.30
Total		−0.4	0	−0.20	0.20	0.75	0.40
Supply elasticities							
Maize w.r.t. maize price		0.3					
Cassava w.r.t. cassava price			Infinite				

Note: * Northern Zambia encompasses all of Agro-Ecological zone 3, which corresponds roughly to Northern, Luapula, Copperbelt, Northwest and Western Provinces. Southern Zambia includes Agro-Ecological Zones 1 and 2, which encompasses most of Central, Southern and Eastern Provinces.

Source: Author's estimates. See Appendix 8A2 for details.

Table 8.4 Projected impact of drought in Zambia under alternative policy regimes

	Baseline		Market responses			Government or food aid imports			Income transfers	
	a. Historic average, good to moderate years**	b. Historic average, without public imports	c. Maize market under autarky	d. Autarky with cassava	e. Private maize imports	f. Small public import	g. Large public import	h. Private imports impeded	i. Targeted cash transfer	j. Cash transfer under an import ban
Shock	None	No subsidized public	Drought	Drought	Drought	Drought	Drought	Drought	Drought	Drought
Policy responses										
Trade Policy	–	–	Import ban	Import ban	Free trade	Free trade	Free trade	Traders spooked	Free trade	Import ban
Public imports (government or food aid)	–	–	–	–	–	Small	Large	Small	–	None
Targeted income transfers (as % poor household base income)	–	–	–	–	–	–	–	–	5%	5%
What adjustments occur?										
Market prize of maize	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Households reduce consumption of maize	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Household substitution of cassava for maize	–	–	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Private imports	–	–	–	–	Yes	Yes	Yes	Very small	Yes	No
Maize market impact										
Production shock			−0.30	−0.30	−0.30	−0.30	−0.30	−0.30	−0.30	−0.30
Production ('000 tons)	945	945	662	662	662	662	662	662	662	662
Net production ('000 tons)	851	851	596	596	596	596	596	596	596	596
Public imports (government or food aid)	28	0	0	0	0	50	255	50	0	0
Private imports										
Government controlled	23	0	0	0	0	0	0	0	0	0
Determined by commercial incentives	0	0	0	0	155	105	0	0	159	0
Supply	902	851	596	596	751	751	851	646	755	596
Price										
Kwacha/kg	791	914	2,406	2,406	1,244	1,244	986	1,967	1,244	2,440
Dollars per ton	$198	$229	$601	$601	$311	$311	$247	$492	$311	$610
Percent change from base	−13%	0%	163%	163%	36%	36%	8%	115%	36%	167%
Demand										
Commercial farms	291	269	152	152	226	226	260	173	223	148

Table 8.4 (continued)

	Baseline		Market responses			Government or food aid imports			Income transfers	
	a. Historic average, good to moderate years**	b. Historic average, without public imports	c. Maize market under autarky	d. Autarky with cassava	e. Private maize imports	f. Small public import	g. Large public import	h. Private imports impeded	i. Targeted cash transfer	j. Cash transfer under an import ban
Poor farm households*	318	302	231	231	269	269	317	248	275	234
Rural non-farm*	48	46	32	32	41	41	45	35	42	33
Middle and rich urban	180	174	135	135	160	160	170	142	160	135
Urban poor*	63	60	45	45	55	55	59	47	55	45
Total demand at market price	902	851	596	596	751	751	851	646	755	596
Maize production (next year)	−4%	0%	34%	34%	10%	10%	2%	26%	10%	34%
National consumption of food staples ('000 tons of maize-equivalent staples)										
Cassava consumption (dried weight)	285	285	285	364	298	298	315	352	298	365
Total maize plus cassava consumption	1,187	1,136	881	959	1,049	1,049	1,165	997	1,053	960
Change from base	51	0	−255	−177	−87	−87	30	−138	−82	−176

Food consumption of poor households ('000 tons of maize-equivalent staples)										
Maize	430	408	308	308	365	365	421	330	372	312
Cassava (in maize equivalents)	178	178	178	221	189	189	185	212	189	222
Total maize equivalents	607	586	485	529	553	553	606	542	561	534
Estimated change in staple consumption										
Poor northern households	10	0	−47	−5	−9	−9	10	−4	−9	−5
Poor southern households	11	0	−54	−52	−23	−23	9	−40	−16	−47
Total poor households	22	0	−101	−57	−33	−33	20	−44	−25	−52

Notes:
* Designates poor households.
** Historic average, good to moderate years.

Source: Zambia spreadsheet model projections.

costs from South Africa, Zambia's most reliable supplier of large-scale maize imports over the past decade. Using lean-season prices on the Johannesburg (SAFEX) commodity exchange over the same eight moderate to good production years results in a Lusaka import parity price of \$311 per tonne. Export parity is computed on the basis of delivery costs to Lubumbashi, since northern Zambia routinely exports maize to Katanga Province in the Democratic Republic of Congo (DRC). Because reliable time series are not available for DRC, the baseline uses available 2006 prices from Lubumbashi, resulting in a Lusaka export parity price of \$170 per tonne.

Baseline incomes and consumption of maize and cassava are displayed in Table 8.2 for the 10 household groups defined in this model. Data required for these computations come from the population census of 2000, the household consumption surveys of 1996 and 1998 and the 2004 social accounting matrix (SAM) for Zambia.

4 SIMULATION 1: IMPACT OF A DROUGHT

Market Responses by Consumers and Traders

Autarky

For Zambia's low-income consumers, the worst of all worlds occurs when they are forced to contend with a production shortfall without recourse to maize imports which would cushion the fall in maize availability and the consequent increase in price. If Zambia were to prevent imports in the face of a drought by failing to issue import permits to the private sector, by announcing large volumes of subsidized public imports and then failing to provide adequate funding (as in 2001), or by some combination of disincentives (as in 2005), the domestic maize price would more than double. Without the moderating impact of private imports, which when flowing unimpeded cap price increases at import parity levels, Zambia's maize price would increase by over 160 per cent. Because poor households bear the brunt of this weather-induced compression in food availability, their maize consumption would fall by roughly 25 per cent, 101 thousand tonnes below normal (Table 8.4, column c).

Consumer substitution of cassava for maize

Even in the unlikely event that government could maintain a completely closed economy in the presence of widespread informal trade flows, this worst-case scenario overstates the compression in food consumption by poor households, because Zambian consumers can fall back on alternative staple foods in situations where maize becomes scarce and the maize price spikes. The projections from our simple multi-market model suggest that a 160 per cent increase in the maize price would induce Zambians to consume roughly an additional 43 thousand tonnes of cassava (measured in dry weight or maize-equivalent calorie terms), thus offsetting about 40 per cent of the shortfall in maize availability. In the cassava-producing regions of northern Zambia, this substitution of cassava for maize would largely eliminate the vulnerable households' maize deficit, freeing up maize they would have otherwise consumed for sale in other zones where consumers have developed a more pronounced preference for maize. In calorie terms, the maize-equivalent consumption shortfall among poor households would fall from 101 thousand to 57 thousand tonnes (Table 8.4, column d).

Free trade

Equally important to vulnerable households are private imports of maize. With both private imports and consumer substitution of cassava for maize, national food security improves markedly, even during a serious drought. The private sector imports 155 thousand tonnes of maize, capping the maize price increase at import parity, or 36 per cent above normal lean-season levels. Although this price rise still triggers a reduction in maize consumption, even among households who prefer maize as their staple food, the resulting shortfall in staple food consumption by poor households falls to 33 thousand tonnes. These results suggest that a failure to anticipate price-induced responses by consumers and private importers would lead to an overstatement of national and poor household consumption shortfalls by 78 and 68 thousand tonnes, respectively (Table 8.4, column e).

Public Imports

Small volumes

If food aid agencies or the Zambian government were to import small volumes of maize to sell domestically at market price, where small is defined as any amount less than the 155 thousand tonnes the private sector would bring in at import parity prices, the results would be the same as under free trade (Table 8.4, columns e and f). In this situation, public imports would simply displace an equivalent volume of private imports. For this combination of side-by-side public and private imports to occur, however, the private sector needs to have confidence that public food managers will operate under transparent, predictable decision rules governing quantities, timing and release prices. The private sector needs to have confidence that the government will not sell imported grain at below-market prices, causing commercial losses for private importers. The government, likewise, needs to have confidence that private importers will not collude to artificially boost import prices above import parity. To develop this mutual trust will require good communications and good will on both sides.

Large public imports

If government or food aid agencies bring in maize volumes in excess of what consumers would purchase at import parity, these large-scale public imports will drive down domestic prices below import parity. In the present example, public imports of 255 thousand tonnes (the maize supply gap projected in column c) would bring down prices below the $311 import parity level to $247 per tonne, resulting in government trading losses of $64 per tonne and a maize price only 8 per cent above normal, in spite of the drought. While benefiting local maize consumers, this would dampen farmers' production response for the coming year from 10 to 2 per cent (Table 8.4, column g).

Private imports impeded

Given late and unpredictable decision making by Zambian authorities, many private firms have become wary of cross-border maize trade. Simulation h considers a scenario, similar to 2001, in which government announces that it will import large volumes of maize, thus scaring off the commercial private trade. Then, due to a shortage of funds or to management difficulties, government ends up bringing in less maize than they intended. If government were to announce that they would import 255 thousand tonnes of maize (as in simulation g), thus scaring away private traders, but then import only 50 thousand tonnes, then maize prices would more than double and staple food consumption (of maize and cassava) by low-income consumers would fall 44 thousand tonnes below normal and 11 thousand tonnes below the free trade level (Table 8.4, columns e and h).

Targeted Income Transfers to Vulnerable Groups

Under free trade

Both food aid agencies and the Zambian government have experimented with temporary employment schemes and cash transfers aimed at increasing the purchasing power of vulnerable households so they can withstand economic shocks without compressing food consumption. The last two columns of Table 8.4 simulate the impact of a cash transfer equal to 5 per cent of annual household income, targeted at low-income households in southern Zambia, at a cost of roughly $74 million. Under free trade, and optimistic household income elasticities of demand for maize (between 0.7 and 1.8), this increased purchasing power would reduce the deficit in food staple consumption among vulnerable households from 33 thousand to 25 thousand tonnes, for a gain of 8 thousand tonnes (Table 8.4, column i).

With closed borders

Under closed borders, however, this income transfer would accomplish very little, other than a minor redistribution of purchasing power. Because wealthy households can outbid the poor, the net impact on maize consumption by vulnerable households becomes very small. Their food staple deficit jumps to 52 thousand tonnes, only a 5 thousand tonne improvement over the autarky solution (Table 8.4, columns d and j). With no additional food supplies to purchase, poor households, even with additional disposable income, find themselves competing against the wealthy for the limited available food supplies. As a result, income transfer programmes are of little use unless free trade, or public food imports, enable available supply to increase along with consumer spending power.

5 SIMULATION 2: CONSEQUENCES OF A BUMPER HARVEST

Market Responses by Consumers and Traders

Autarky

With closed borders, a 30 per cent increase in maize production, to 1.2 million metric tonnes, causes the lean season maize price to fall by half, to $114 per tonne. Given export parity at approximately $170 per tonne, this affords significant opportunities for export to DRC, Angola and in some years to Malawi and Zimbabwe. In the absence of export authorization or long-term domestic stock build-up, national maize consumption will rise by 255 thousand tonnes with low-income consumers absorbing an additional 100 thousand tonnes of maize-equivalent food consumption (Table 8.5, column c).

Cassava consumption response

Reversing the drought-year scenario, a bumper maize harvest leads to increased maize consumption and decreases in consumption of other food staples, of which cassava is the most prominent. The model projections

Table 8.5 Projected impact of bumper harvest in Zambia under alternative policy regimes

	Baseline		Market responses			Export controls			Domestic procurement	
	a. Historic average, good to moderate years	b. Historic average, without public imports	c. Maize market under autarky	d. Autarky with cassava	e. Private maize imports	f. Export ban	g. 100,000 tons export	h. 200,000 rons export	i. Procure-ment, no exports	j. Procure-ment, with exports
Shock	None	No subsidized public imports	Production increase	Production increase	Production increase	Production increase	Production increase	Production increase	Production increase	Production increase
Policy responses										
Trade policy	–	–	Export ban	Export ban	Free trade	Export ban	Export	Export	Export ban	Free trade
Government procurement, stockpiling or export	–	–	–	–	–	–	–	–	100	100
What adjustments occur?										
Market prize of maize	–	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Households increase consumption of maize	–	–	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household substitution of maize for cassava	–	–	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Private exports	–	–	No	No	Yes	No	100	200	No	Yes

Maize market impact										
Production shock			0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
Production ('000 tons)	945	945	1,229	1,229	1,229	1,229	1,229	1,229	1,229	1,229
Net production ('000 tons)	851	851	1,106	1,106	1,106	1,106	1,106	1,106	1,106	1,106
Public net imports or procurement	28	0	0	0	0	0	0	0	100	100
Private trade, net imports										
Government controlled	23	0	0	0	0	0	−100	−200	0	0
Determined by commercial increase	0	0	0	0	−150	0	0	0	0	−50
Supply	902	851	1,106	1,106	956	1,106	1,006	906	1,006	956
Price										
Kwacha/kg	791	914	458	456	680	456	578	751	578	680
Dollars per ton	$198	$229	$114	$114	$170	$114	$145	$188	$145	$170
Percent change from base	−13%	0%	−50%	−50%	−26%	−50%	−37%	−18%	−37%	−26%
Demand										
Commercial farms	291	269	388	388	316	388	343	298	343	316

Table 8.5 (continued)

	Baseline		Market responses			Export controls			Domestic procurement	
	a. Historic average, good to moderate years	b. Historic average, without public imports	c. Maize market under autarky	d. Autarky with cassava	e. Private maize imports	f. Export ban	g. 100,000 tons export	h. 200,000 rons export	i. Procure-ment, no exports	j. Procure-ment, with exports
Poor farm households*	318	302	374	373	335	373	342	311	342	335
Rural non-farm*	48	46	59	59	51	59	54	49	54	51
Middle and rich urban	180	174	210	210	188	210	197	183	197	188
Urban poor*	63	60	76	76	66	76	70	64	70	66
Total demand at market price	902	851	1,106	1,106	956	1,106	1,006	906	1,006	956
Maize production (next year)	−4%	0%	−15%	−15%	−4%	−15%	−9%	−2%	−9%	−4%
National consumption of food staples ('000 tons of maize-equivalent staples)										
Cassava consumption (dried weight)	285	285	285	243	270	243	253	264	253	270
Total maize plus cassava consumption	1,187	1,136	1,391	1,350	1,227	1,350	1,259	1,171	1,259	1,227

Change from base	51	0	255	214	91	214	123	35	123	91
Food consumption of poor households ('000 tons of maize-equivalent)										
Maize	430	408	508	508	452	508	466	425	466	452
Cassava (maize equivalents)	178	178	178	153	167	153	160	169	160	167
Total maize equivalents	607	586	686	661	620	661	627	594	627	620
Estimated change in staple consumption										
Poor northern households	10	0	50	26	11	26	12	1	12	11
Poor southern households	11	0	50	49	23	49	28	7	28	23
Total poor households	22	0	100	75	34	75	41	8	41	34

Note: * Indicates 'poor' household groups.

Source: Zambia spreadsheet model projections.

suggest that national cassava consumption by poor households would fall by about 25 thousand tonnes, thus reducing their consumption gain from 100 to 75 thousand tonnes (Table 8.5, column d).

Private exports

Private traders would have incentives to export 150 thousand tonnes at the estimated export parity price of $170 per tonne. This would prevent domestic prices from falling below that level, thereby reducing the maize price fall from 50 per cent of the base year price under autarky to 26 per cent (Table 8.5, column e).

Export Controls

Export ban

Under an export ban, prices would fall by 50 per cent, to $114 per tonne, and staple food consumption would increase by 255 thousand tonnes (Table 8.5, columns d and f). Because of low prices, farmers would reduce area planted to maize by a projected 15 per cent rather than the 4 per cent drop at the export price of $170 per tonne. Given weather-induced uncertainties, the combination of a 15 per cent fall in planted area together with a drought the following season would lead to an exacerbated bust following an initial bumper harvest.

Export quota

One hundred thousand tonnes: exports of 100 thousand tonnes of maize would moderate the fall in maize price, limiting it to 37 per cent, or $145 per tonne rather than the $114 projected under a full export ban (Table 8.5, column g).

Export quota

Two hundred thousand tonnes: when exports exceed the 150 thousand tonne level expected at export parity, the fall in maize price is limited to $188 per tonne, or 18 per cent below the base level. Since commercial exports are not profitable at this level, they can only occur through the FRA. In this situation, government subsidies are required to support farm prices above the $170 export parity level.

Domestic Procurement

Procurement

Domestic procurement of 100 thousand tonnes achieves the same impact as 100 thousand tonnes of maize exports (Table 8.5, columns g and i). In both cases, the maize price falls to $145 per tonne rather than to $114. This result, however, holds only if the FRA maintains the full 100 thousand tonnes as carry-over stocks until the next season. Any uncertainties about the timing or pricing of FRA offtake will tend to depress market price and undercut the intended benefits of farm price support through domestic procurement.

Procurement plus exports

If domestic procurement occurs under a free trade regime, then the procurement simply displaces an equal amount of prospective exports (Table 8.5, columns i and j). Thus, domestic procurement or exports can achieve the same result, reducing domestic supply and boosting market price. The biggest difference between the two alternatives is that under a domestic procurement programme the public procurement agency will eventually have to dispose of its stocks. During Zambia's 2006 season, the large overhang in FRA stocks resulting from their 400 thousand tonnes of procurement caused considerable uncertainty as to whether the FRA would export or when and at what price they would ultimately dispose of their accumulated maize stocks.

Regional Food Aid Procurement

Given consistent access to regional markets, Zambia's grain traders believe that Zambia could increase production enough to routinely supply surplus maize to neighbouring countries. In that eventuality, Zambia could become a regular supplier of regionally procured food aid. Indeed, the World Food Programme (WFP) has recently opened a regional food aid procurement office in Lusaka, and they have begun purchasing locally for distribution within Zambia as well for delivery to DRC, Malawi, Zimbabwe, Tanzania and Angola. Over the past five years, Zambia has become the fifth largest African food aid supplier to WFP (Tschirley and del Castillo, 2006). Certainly, in surplus production years, regional food aid procurement offers a potentially useful tool for ensuring external markets for growing domestic production. But realizing this goal will require significant improvement in the predictability and transparency of government trade policy.

Applying the Model during the 2006 Export Debates

Following Zambia's excellent maize harvest of 2006, intense policy debates arose between government, farmers and trade groups, with millers advocating an export ban on maize grain while farmers and traders advocated exports. To help inform these debates, Zambia's Agricultural Consultative Forum (ACF) convened a group of stakeholders in July 2006 to discuss policy alternatives. At the request of the Zambian Grain Traders' Association, the authors used this model to assess the likely impact of the bumper harvest on maize prices, without exports and under varying levels of export quotas (Haggblade, 2006b). Following presentation of these results at the ACF meeting and publication in the Zambian *Farmer* magazine (Haggblade, 2006a), the government ultimately authorized 100 thousand tonnes of export through the FRA. In a highly politicized election year, it would be imprudent to impute any direct causality. However, we can say with some confidence that various stakeholder groups demonstrated an interest in objective empirical analysis and that these results did help to inform the ongoing policy discussions.

6 SENSITIVITY ANALYSIS

Two key parameters, the responsiveness of maize and cassava consumption to changes in the maize price, govern the magnitudes, although not the direction of change, projected in this two-commodity model. The own-price elasticity of demand for maize governs maize price volatility following a supply shock as well as the quantity response of households as the maize price changes. Since suppliers and consumers typically identify more substitution possibilities in the medium run than in the short run, medium-run demand curves are typically flatter than short-run curves. Therefore, the sensitivity analysis in Table 8.6 examines the consequences of a 30 per cent supply reduction in maize output, the same supply shock as in Table 8.4, when the average national own-price elasticity of demand for maize increases (in absolute value) from −0.4 to −0.6. The results suggest that price volatility under trade controls will fall by about 50 per cent. However, because quantity responses become more accentuated, maize consumption by poor households falls more than in the comparable baseline projections. Because cassava substitution for maize also falls under a moderated price increase, the fall in calorie consumption of maize plus cassava nearly doubles, increasing from 57 to 105 thousand tonnes. Under free trade, total national maize consumption and imports fall because the 36 per cent price increase to export parity triggers a greater reduction in maize demand, given the flatter demand curve. As under autarky, the reduction in staple food consumption by poor households roughly doubles, in this instance from 33 to 66 thousand tonnes. These results imply greater food substitution possibilities than under the baseline parameters.

Table 8.6 Sensitivity analysis

	Baseline projections		Sensitivity analysis	
	Historical	Drought: 30% production fall	S1. maize price elasticity	S2. cassava responsiveness to maize price
Parameters				
ES_{mm}	−0.4	−0.4	−0.6	−0.4
ES_{cm}	0.2	0.2	0.2	0.4
d. Impact of a 30% shortfall in production under autarky with cassava subsititution*				
Maize price				
Price ($/ton)	$229	$601	$422	$601
Percentage change from base	0	163%	85%	163%
National food staple consumption				
Maize	851	596	596	596
Cassava (dried equivalent)	285	364	326	426
Total	1,136	960	922	1,022
Change	0	−177	−214	−114
Poor household food staple consumption				
Maize	408	308	279	308
Cassava (dried equivalent)	178	221	203	268
Total	586	529	482	576
Change	0	−57	−104	−10
e. Impact of a 30% shortfall in production with private maize imports*				
Maize price				
Price ($/ton)	$229	$311	$311	$311
Percentage change from base	0	36%	43%	36%
National food staple consumption				
Maize	851	751	686	751

Table 8.6 (continued)

	Baseline projections		Sensitivity analysis	
	Historical	Drought: 30% production fall	S1. maize price elasticity	S2. cassava responsiveness to maize price
Cassava (dried equivalent)	285	298	298	314
Total	1,136	1,049	984	1,065
Change	0	−87	−152	−71
Poor household food staple consumption				
Maize	408	365	331	365
Cassava (dried equivalent)	178	189	189	201
Total	586	554	520	566
Change	0	−33	−66	−20

Notes:
ES_{mm} = elasticity of maize supply with respect to maize price.
ES_{cm} = elasticity of cassava supply with respect to maize price.
* d. and e. refer to the comparable columns in Table 8.4.

Source: Model simulations.

The second key parameter, the cross-price effect of the maize price on cassava consumption, measures the willingness of households, particularly those in the dual-staple northern zones, to substitute cassava for maize when the maize price spikes. The final column in Table 8.6, therefore, explores the impact of a cross-price elasticity double that of its own-price elasticity, increasing from 0.2 to 0.4 to the high-side estimate developed in Appendix 8A2. Under autarky, this higher price responsiveness of cassava consumption leads to a reduction of nearly 80 per cent in the staple food deficit of poor households, whose food gap falls from 57 to 10 thousand tonnes. Under free trade, the food staple deficit likewise falls, this time by about 40 per cent, from 33 to 20 thousand tonnes of cassava plus maize. Not surprisingly, greater substitutability for other foods helps to cushion the impact of a drop in maize supply.

The qualitative conclusions and directions of change remain unchanged under these sensitivity analyses. While we believe that the empirical estimates of these elasticities used in the baseline projections in Tables 8.4 and 8.5 offer the best approximation of quantitative responses by households, these sensitivity results help to underscore an important finding. Both highlight the importance of food substitution in moderating shortfalls in maize availability. Given a spectrum of drought-resistant alternative foods, and given the sizeable magnitude projected in these simulations for the cassava substitution effect alone, these alternative foods clearly merit greater attention in future empirical and policy work.

7 CONCLUSIONS

Regional Trade as a Tool for Moderating Price Volatility

Open borders offer a financially inexpensive means of reducing the domestic price volatility of staple foods. The import parity price sets an upper bound, while export parity sets a floor below which prices will not fall, assuming that private traders enjoy the freedom to import and export maize when market conditions permit. The alternative policy of closing borders in small markets such as Zambia invites the prospect of significant price volatility. Under normal production fluctuations, a closed border can easily lead to price volatility in the range of 100 per cent from one year to the next.

Moreover, common government interventions – such as export and import quotas and price subsidies – may inadvertently accentuate domestic price volatility. In the short run, uncertainties over government intentions about trade volumes, tariffs and pricing risk driving commercial traders out of the market, thereby exacerbating price fluctuations. In the medium run, price volatility poses serious problems for commercial farmers of all sizes, particularly under rainfed conditions, where low production and very high prices in one season may lead to significant expansion in planted area next season. Under common weather patterns, a poor season followed by a good one will lead to exaggerated boom and bust pricing and production cycles.

Although many policy makers labour to mediate the short-run conflict between consumer and farmer interests, over the long run, both constituencies benefit from the stability afforded by import and export parity prices. Long-term agricultural production and productivity growth will certainly benefit from a reduction in year-to-year price volatility. Low-income consumers, in particular, benefit by avoiding the extreme compression in basic food consumption from one year to the next. Open borders, thus, offer an inexpensive means of moderating year-to-year swings in staple food prices and consumption.[6]

Substitution among Food Staples

Although food policy in much of Africa focuses on maize, vulnerable households consume a wide range of food staples. Drought-tolerant staples such as sorghum, millet, sweet potatoes and cassava allow consumers to substitute these foods for maize in response to highly variable maize availability. As the evidence from Zambia suggests, neglecting these substitution effects will lead government and food aid agencies to overstate emergency food requirements. As an indicative order of magnitude, our projections suggest that, together, open borders and consumer substitution of cassava for maize could absorb roughly two-thirds of the consumption shock to vulnerable households during a drought year.

Food Aid Assessments

To accurately project consumption shortfalls and food aid needs, food aid agencies must anticipate market responses by consumers and traders. Failure to anticipate private sector imports can lead to potentially significant overstatement of food aid needs, as the Malawian example of 2003 illustrates (Whiteside, 2003; Tschirley et al., 2004). Failure to consider known substitution possibilities among food staples, such as root crops and drought-resistant cereals, will exacerbate the tendency to overestimate food shortages.

Trade likewise matters in the design of income transfer programmes. In a closed market, without access to food imports, income transfers will not be effective in raising vulnerable household food consumption. Poor households will simply bid against the rich for limited food supplies. Food aid agencies, like poor consumers, benefit from open borders.

Importance of Transparency and Predictable, Clear Signals from Government

Predictability, transparency and policy consistency are crucial for maintaining incentives for private sector trade. Zambia's frequent policy shifts have made cross-border maize trade a risky proposition and have clearly dampened trader incentives to import and export maize.

Where governments mistrust traders and fear collusion, increased competition offers one potential antidote. Yet in Zambia, four out of five international grain trading firms have exited the market over the past decade due to the unpredictability of government policy. As this exodus illustrates, even under trade regimes involving some form of public involvement or control, government actions must at least be predictable or private traders will head for the sidelines. Their departure can prove costly to domestic consumers. Our empirical simulations suggest that government interventions accompanied by execution failures or unclear policy signals can lower food availability compared to what would have occurred under an open trade regime.

NOTES

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2. Section 2 describes this evolving policy stance in some detail.
3. We have developed this model at the request of the World Food Programme (WFP) Markets Group in conjunction with the Zambia-based Food Security Research Project (FSRP) – a consortium including Michigan State University, Zambia's Ministry of Agriculture and Cooperatives (MACO) and the Agricultural Consultative Forum (ACF).
4. For further details on this and other market assessment tools, see the World Food Programme's Strengthening Emergency Needs Assessment Capacity (SENAC) website at http://www.wfp.org/operations/Emergency_needs/index.asp.
5. Although CSO has conducted later LCMS surveys in Zambia, they have not yet released these raw data to outside researchers.
6. The alternative of government-held buffer stocks and market interventions has been reviewed by Byerlee et al. (2006).

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APPENDIX 8A1 MODEL EQUATIONS

Production:

$$X^i = X^i o * (P^i / P^i o)^{ES_{ii}} * (P^j / P^j o)^{ES_{ij}} \; i = \text{maize}, j = \text{cassava},$$

Short run: ES_{ii} and $ES_{ij} = 0$, for i = maize;
Cassava: ES_{ii} = infinity in both short and long runs.

Consumption:

$$C^{h,i} = \alpha^M o * C^{hi} o * (P^i / P^i o)^{ED_{hii}} * (P^j / P^j o)^{ED_{hij}} * (Y^j / P^j o)^{EDY_{hi}}$$
$$i = \text{maize}, j = \text{cassava};$$

$EDY_i = 0$ for i = cassava.

Income:

$$Y_h = v^i * P^i * X_h^i + v^j * P^j * X_h^j + Y_h o + YTFR_h \; i = \text{maize}, j = \text{cassava};$$

$V_j = 0$ for j = cassava; (implicitly ignore income changes from cassava production).

Trade:

Private	(free trade quotas)	$MPRIV^M = C^M - X^M - MPUB^M$;
		$MPRIV^M = MPRIV$;
Public		$MPUB^M = MGOV^M + MFOODAID^M$.

Supply:

Maize	$S^M = X^M - LOSS^M + MPRIV^M + MPUB^M$;
Cassava	$S^C = X^C$.

Demand:

Maize	$D^M = C^M + \Delta STOCKS^M + GOVPURCH^M - GOVSALE^M$;
Cassava	$D^C = C^C$.

Equilibrium:

Maize	$S^M = D^M$;

Cassava $S^C = D^C$.

Autarky price:

PD^M = equilibrium price with $MPRIV$ and $MPUB = 0$;
$PIMP^M$ = import parity price (Johannesburg to Lusaka);
$PEXP^M$ = export parity price (Lusaka to Lubumbashi).

Market price:

$$\begin{aligned} P^M = {} & PIMP^M \text{ if } PD^M > PIMP^M \\ & PD^M \text{ if } PEXP^M < PD^M < PIMP^M \\ & PEXP^M \text{ if } PD^M < PEXP^M. \end{aligned}$$

APPENDIX 8A2 DERIVATION OF ELASTICITIES USED IN THE MODEL

Supply Elasticities

For maize, Kapeta (1984), Harber (1992) and Nakaponda (1992) have estimated supply elasticities ranging between 0.21 and 0.80. As a conservative order of magnitude, the model uses 0.3 in projecting the following year supply response to changes in last year's price.

Because farmers can harvest cassava any time over a three-year period, and because many maintain a surplus for food security purposes, the model takes the supply elasticity of cassava as perfectly elastic in the short run. For this reason, the price of cassava remains fixed in the model projections.

Expenditure Elasticities

Due to the paucity of existing estimates of expenditure elasticities in Zambia, particularly for cassava, we have estimated these directly using the 1998 LCMS survey data, the latest released to outside researchers by the CSO. Given regional differences in consumption preferences, we have estimated parameters separately for each region and household group in the model. In the presence of large numbers of zero observations (ranging from 20 to 50 per cent for cassava in the north, from 10 to 60 per cent for maize in the north) we have estimated Tobit regressions using two alternative functional forms. With over 95 per cent zero observations for cassava in the south, we have been unable to estimate demand parameters and have simply used the elasticity estimates taken from the north. Given the tiny budget shares for cassava in the south, these parameters will not affect the model projections.

Own-price Elasticities

Given the unavailability of price data in the LCMS survey, we were unable to estimate price elasticities directly. Therefore, we have estimated plausible ranges using standard relationships from the linear expenditure system. The results conform to results available in the secondary literature.

Cross-price Elasticities

Because the model considers the price of cassava to remain fixed, the key cross-price elasticity in this model becomes the elasticity of demand for cassava with respect to the price of maize. Because farmers and consumers in northern Zambia produce and grow both cassava and maize, and because they can adjust their cassava harvest and consumption as they wish over the three-year harvest cycle, they are able to raise and lower cassava consumption quickly, thus releasing more or less maize for sale. In drought years, they benefit from the spike in maize prices by selling more maize and consuming more cassava. The cross-price elasticity of demand projects the resulting responsiveness of cassava consumption to changes in the maize price.

Without price data from our available household survey, we have adopted a simple rule of thumb based on cross-price elasticity estimates from elsewhere between major and secondary food staples. These results suggest that the cross-price elasticity of demand for the minor staple (wheat in Bangladesh and other cereals in South Africa) with respect to the price of the major staple (rice and maize, respectively) ranges between 1 to 2 times the value of the own-price elasticity, signs reversed. As a conservative estimate of the cross-substitution effects, the base model projections take the cross-price elasticity of demand for cassava with respect to the price of maize as equal to the negative of cassava's own-price elasticity of demand, giving a base value of 0.2. However, the sensitivity analysis in Table 8.6 reports the larger impact resulting when the cross-price effect lies at the higher end of this range, double the own-price effect.

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9. Maize trade and marketing policy interventions in Kenya

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1 INTRODUCTION

Maize marketing and trade policy in Kenya has been dominated by two major challenges. The first concerns the classic food price dilemma: how to keep farm prices high enough to provide production intensification incentives for farmers while at the same time keeping them low enough to ensure poor consumers' access to food. The second major challenge has been how to effectively deal with food price instability, which is frequently identified as a major impediment to smallholder productivity growth and food security. Redressing these causes of low farm productivity and food insecurity are major challenges facing Kenyan policy makers.

The question of how to reduce food price risks and raise smallholder farm productivity quickly brings us to the role of the state and the private sector in markets. There is widespread agreement that the state has a crucial role to play in developing strong output markets in Africa. However, there are major controversies as to what exactly these critical government roles are, and how they should be implemented.

Maize is widely regarded as the 'sleeping giant' of Kenyan agriculture. Maize accounts for the single largest share of cultivated land in Kenya. It is commonly viewed that the maize sector has achieved lacklustre performance over the past two decades and has dragged down the country's overall agricultural performance, which in other respects appears to be quite vibrant. This study is devoted to identifying the major constraints impeding the performance of the maize value chain, with particular emphasis on marketing and trade policies, and identifying possible options for stimulating pro-poor maize productivity growth and food security.

The remainder of the chapter is organized as follows. Section 2 describes the data presented in this study. Section 3 reviews Kenya's maize marketing and trade policy objectives, the rationale behind these objectives, and a chronology of policy interventions used to achieve these objectives. Section 4 assesses the performance of the maize sector since the late 1980s when the country initiated a series of agricultural policy reforms. Section 5 provides a discussion of alternative policy and public investment options for promoting the performance of the maize marketing and trade system. Section 6 summarizes the main findings and conclusions of the study.

2 DATA

This study utilizes three kinds of data: (i) secondary data obtained from various Kenyan government ministries, such as monthly maize price levels, National Cereals and Produce Board (NCPB) maize purchases and sales, (ii) nationwide rural household panel survey data, covering the 1996/97, 1999/2000 and 2003/04 crop seasons, and (iii) data and analysis contained in secondary reports. Further detail is provided on the first two data sources.

Crop production data and overall measures of agricultural productivity growth are based on FAO Statistics data (available at: www.faostat.fao.org/). Data on government maize purchases, sales, and prices, and national fertilizer imports were obtained from the NCPB and the Ministry of Agriculture.

The household survey data is a nationwide sample of 1,313 small farm households in 24 districts collected by the Tegemeo Institute of Egerton University during the years 1997, 2000 and 2004. For further details on this nationwide sample, see Argwings-Kodhek (1998).

3 KENYA'S MAIZE MARKETING AND TRADE POLICY OBJECTIVES AND POLICY INTERVENTIONS

Food security has generally been taken as synonymous with maize security by policy makers and other segments of society. This is because maize is not only the main staple food but also the most common crop grown by rural poor households for food (Nyoro et al., 1999). The importance attached to maize by policy makers in Kenya can be inferred from the emphasis laid on it in current and past national food policies.

Attempts at reforming the maize marketing and pricing system began in the late 1980s. Up until that time, the government set producer and into-mill prices for maize and set maize meal prices to be sold by millers and retailers to consumers. These prices were pan-territorial and pan-seasonal, adjusted once per year at the beginning of the marketing season. The government marketing board, the NCPB, had a longstanding monopoly on internal and external trade. Informal private trade across district boundaries was illegal, as was cross-border trade. Traders were required to apply for movement permits to allow them to transport grain across district boundaries. Despite government attempts at suppression, some private maize trade existed in Kenya even during the control periods before the liberalization process began in the late 1980s.

The Cereal Sector Reform Programme (CSRP) began in 1987/88 as part of the country's overarching structural adjustment policies. At first, the government and donors agreed to legalize inter-district maize trade, with the maximum volume of maize trade to be progressively raised over time. The reform agreement also called for the NCPB to reduce its market share (that is, maize purchased as a proportion of total maize traded) over time, by widening the margin between its maize purchase and selling price, which would have provided greater scope for the private sector to operate. In fact, the NCPB's trading margin declined in the early 1990s, which had the opposite effect, making it unprofitable for the private sector to engage or invest in many types of marketing activities, especially long-distance trade.

The reform process intensified in late 1993, when, under pressure from international lenders, the government eliminated movement and price controls on maize trading, deregulated maize and maize meal prices, and eliminated direct subsidies on maize sold to registered millers (Jayne and Argwings-Kodhek, 1997). By 1995, private traders were allowed to transport maize across districts without any hindrance.

The reform process was expected to raise competition by encouraging more private sector participation in the market and thereby reduce costs in the marketing system. In practice, the implementation of the reforms has most likely exacerbated the risks and costs of private sector investment because they have been marked by frequent and usually unanticipated changes in trade tariffs, quantity restrictions, and regulatory changes facing private traders. The discretionary policy tools used by the government to influence market prices and supplies, and which raised market uncertainty for traders include: (i) frequent and unannounced changes in maize import tariff rates; (ii) export bans; (iii) the behaviour of the NCPB, in particular the prices it sets for maize purchase and sale, and the funds allocated for this purpose by the treasury, which then determine the extent to which the NCPB can defend its official pricing structure and influence market prices; and (iv) regulatory changes regarding the amount of freedom the private sector was permitted in maize marketing.

In addition to these sources of uncertainty, the liberalization process has created additional risks for private investment associated with the uncertainty over the eventual dispensation of NCPB assets. Private investment in dedicated capital outlays, such as storage facilities, has been impeded by the high degree of uncertainty over the disposition of the NCPB's storage facilities and other assets. New private investment in storage facilities could be vulnerable to huge losses if the NCPB continued to be a major player in the market, offer prices to farmers and millers that did not rise through the marketing season (pan-seasonal prices), and set a narrow margin between its buying and selling prices that was covered by the treasury – all of which happened during much of the 1990s. Table 9.2, below, provides a detailed chronology of these interventions.

Prior to market liberalization in the late 1980s, the NCPB purchased between 5 and 8 million bags of maize per year. Even during the early years of liberalization, the NCPB received enough public funds to purchase between 3 and 6 million bags per year, which was more than half of domestically marketed maize output. Thus, the NCPB remained the dominant player in the maize market even 6–7 years into the liberalization process. This is not surprising considering that the NCPB set its maize purchase prices considerably higher than prevailing market prices. In the maize breadbasket areas of western Kenya, the incomes and living standards of many farmers, especially large-scale farmers, depended on the NCPB continuing to offer support prices for maize. In this way, by offering above-market support prices, the NCPB used its market power and access to treasury subventions to discourage private sector investment in maize wholesaling and storage.

Starting in the 1995/96 marketing year, and under pressure from external donors, the government dramatically reduced the NCPB's operating budget. This forced the NCPB to scale back its purchases substantially to about 1 million bags per year between 1995 and 2000 (Table 9.1). The reduction in NCPB maize purchases from 3–8 million to 1 million bags led to intensive lobbying by commercial maize farmers for increased purchases. Gradually, a year before the national elections, the government increased the NCPB's budget in the 2000/01 year. Since 2000, the NCPB's maize purchases have been trending upward. In drought years, when market prices are already relatively high, the NCPB tends to purchase relatively small volumes. In normal or good years, the NCPB's purchases have exceeded 3 million bags, which is believed to be roughly 25–35 per cent of the total maize sold by the small and large farm sector in Kenya, and is approaching the scale of operations played by the NCPB during the pre-reform era.

Most of the maize purchased by the NCPB now appears to be directly from large-scale farmers in the maize surplus parts of the country, where unit procurement costs are low due to scale economies. Since the major withdrawal of the NCPB in 1995, Tegemeo/Egerton survey data show

Table 9.1 NCPB maize trading volumes and price setting, 1988/89 to 2006/07

Year	Total output (000 mt) (A)	NCPB maize purchase and sale price (ksh per 90 kg bag)				NCPB maize purchases (000 mt) (F)	NCPB maize sales (000 mt) (G)	Official exports (000 mt) (H)	Official imports (000 mt) (I)
		Nominal		Inflation-adjusted (2005=100)					
		Purchase price (B)	Sale price (C)	Purchase price (D)	Sale price (E)				
1988/89	2761	201	326	1725	2703	643.81	–	167	0
1989/90	2631	221	337	1680	2561	551.30	–	110	0
1990/91	2290	250	337	1645	2215	235.27	669.55	160	0
1991/92	2340	300	358	1649	1961	318.91	735.18	19	75
1992/93	2430	420	646	1679	2582	493.36	257.45	0	0
1993/94	2089	950	1280	2549	3434	467.55	512.82	0	89
1994/95	3060	920	1280	1960	2728	540.00	67.73	2	121
1995/96	2699	600	887	1235	1825	100.82	111.27	154	0
1996/97	2160	1127	1100	2232	2176	62.82	54.27	221	0
1997/98	2214	1162	1318	2172	2463	151.45	14.64	9	565
1998/99	2400	1009	1209	1764	2113	34.91	123.27	13	0
1999/00	2322	1200	1436	1923	2301	177.18	145.09	37	52

Table 9.1 (continued)

Year	Total output (000 mt) (A)	NCPB maize purchase and sale price (ksh per 90 kg bag)				NCPB maize purchases (000 mt) (F)	NCPB maize sales (000 mt) (G)	Official exports (000 mt) (H)	Official imports (000 mt) (I)
		Nominal		Inflation-adjusted (2005=100)					
		Purchase price (B)	Sale price (C)	Purchase price (D)	Sale price (E)				
2000/01	2160	1250	1300	1812	1884	311.45	74.09	7	498
2001/02	2776	1000	1250	1414	1768	257.73	23.73	6	472
2002/03	2441	1052	1265	1408	1693	89.09	196.36	0	24
2003/04	2714	1358	1680	1670	2066	162.00	136.73	48	109
2004/05	2459	1400	1950*	1566	2181	314.08	144.02	14	273
2005/06	2918	1250	1770*	1250	1770	135.29	375.56	5	207
2006/07	3248	1300	1500*	1161	1339	407.17	97.63	–	–

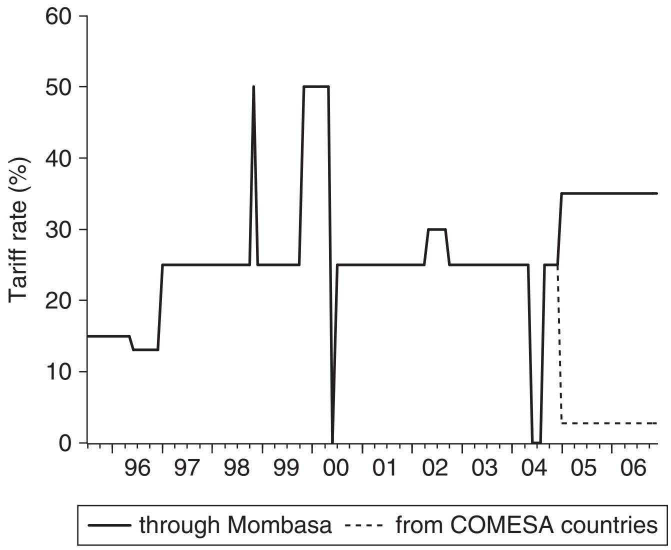
Note: * NCPB maize selling price changed from pan-territorial to province specific in 2004. Prices shown are for Nairobi and Central Provinces.

Source: National Cereals Produce Board (NCPB), Kenya Revenue Authority (KRA), Ministry of Agriculture (MoA).

that most small farmers in Kenya sell their maize to private traders. The Tegemeo/Egerton/MSU household survey has tracked the maize selling and buying behaviour of 1,313 small farm households in 1996/97, 1999/00 and 2003/04. About 28.6 per cent of these households are located in the prime maize-surplus districts of Trans Nzoia, Uasin Gishu, upper Kakamega, Nakuru, upper Narok and Bomet. In this high-potential maize zone, we find that 9 per cent of the maize-selling households sold maize to the NCPB. The other 91 per cent of the households selling maize in the high-potential maize zone sold to private buyers. Over the entire nationwide sample, only 2 per cent of the households sold to the NCPB, while 34 per cent sold to private buyers. The remainder of the sample did not sell maize. Yet, as will be shown later, the NCPB indirectly influences millions of small farmers and urban consumers through the upward pressure that its operations exert on maize market prices.

The 2007 National Food and Nutrition Programme (NFNP) is a draft government document that attempts to address the shortcomings in earlier policy documents. In particular, the NFNP shifts the focus away from maize self-sufficiency to a more comprehensive policy of food access, diversity and nutritional status (Republic of Kenya, 2007). It acknowledges that high staple food prices, while favourable to farmers who can produce a surplus, directly hurt not only urban consumers but also a large portion of rural small-scale farmers who are net buyers of staple food. The NFNP emphasizes increased availability and accessibility to diverse foods to meet the basic minimum food nutritional requirements. It proposes a gradual removal of import duties on maize, wheat and rice, promotion of cross-border trade in food items, control importation of subsidized foods, and educating local authorities and administrators on the importance of free movement of food items. By proposing appropriate reforms in domestic and external trade policy, the NFNP brings into perspective the importance of perceiving food security in the broader context of regional market integration and globalization rather than just as a localized issue (Nyoro et al., 2007).

Another important aspect of maize price determination in Kenya concerns trade policy. In order to support maize prices in the main growing areas, the government imposed tariffs on maize imports, both at the port of Mombasa and at border crossings along the Ugandan and Tanzanian borders. Figure 9.1 shows the frequent variations in maize import tariff rates, both for internationally sourced maize through the port of Mombasa as well as from other countries in the region. Since the inception of the East African Custom Union in January 2005, maize imports from other COMESA (Common Market for Eastern and Southern Africa) countries have been taxed only at the rate of 2.75 per cent.



Source: Ministry of Industry and Commerce.

Figure 9.1 Maize import tariff rates, 1995–2006

Evidence indicates that the costs of maize production in eastern Uganda are typically lower than in most areas of Kenya (Nyoro et al., 2004), and import tariffs were deemed necessary to stem the inflow of imported maize from Uganda. However, since the border is relatively porous, illegal cross-border trade was common, estimated at 100,000 to 250,000 metric tons per year (Ackello-Ogutu and Echessah, 1997). It is alleged that relatively high NCPB support prices encouraged maize imports from Uganda at the same time that official trade policy attempted to suppress it. This confusion was compounded by the fact that these export bans, import bans and major changes in import tariff rates as shown in Figure 9.1 were not anticipated by market participants as the government in most cases never consulted with them or provided prior announcement of trade policy changes.

Imposing an import ban or high tariff rates benefited the large maize producers who were able to market their surplus at relatively higher prices compared to the situation that could have existed without bans. Conversely, a much larger group of net maize-buying rural households and urban consumers were adversely affected to the extent that import tariffs raised domestic maize prices. However, the distributional effects were likely to be relatively small. A recent analysis indicates that maize import tariffs over the 1995–2004 period raised mean domestic prices by roughly 4 per cent, although in several years, the import tariff raised domestic price levels by well over 10 per cent (Jayne et al., 2008).

However, since 2005, Kenya's maize trade policy has stabilized considerably. It has complied with regional initiatives under COMESA and the East African Community (EAC) to eliminate cross-border tariffs within the region and harmonize regional and international trade policies. Since January 2005, the tariff on maize imported into Kenya from Tanzania and Uganda has been limited to a 2.75 per cent government levy. Imports of maize grain from Mombasa continue to attract a 35 per cent tariff.[2]

While formal maize import tariff rates are being harmonized in the region, numerous non-tariff barriers to regional trade remain. Though a Single Entry Document (SED) is required for custom clearance for COMESA countries, Kenya has additional requests for other information that makes it difficult for traders to fill in these forms, which delays customs clearance. Before being cleared through customs, one might need a combination of the following forms: original invoice; Import Declaration Form; Pre-Shipment Inspection (Clean Report of Finding: CRF); Certificate of Origin; Phytosanitary Certificate; Quality Standards Certificate (issued by Kenya Bureau of Standards); and Safety Standards Certificate, among others. The issuance of most of the import documents is centralized at the capitals or at major towns which means that maize traders have to travel long distances to obtain the documents. Non-tariff barriers in the form of cumbersome trade regulations have constrained official regional trade and increased informal unregistered cross-border trade. However, unregistered or unrecorded cross-border trade incurs additional transaction costs, bribe payments and handling costs which are most likely paid for by producers and consumers in the form of lower producer prices and higher consumer prices. This is one area where further research can provide useful information in estimating the costs of these non-tariff barriers and how they compare with official tariff rates.

The major aspects of Kenya's 'stop–go' maize marketing and trade policies, from the inception of liberalization in the late 1980s, are summarized in Table 9.2.

4 PERFORMANCE OF THE MAIZE SECTOR

This section reviews the following aspects of Kenya's maize value chain performance: (i) the relative importance of maize in smallholder agricultural production and marketing; (ii) maize yield trends; (iii) trends in wholesale grain prices, retail meal prices, and the impact of government marketing and trade policy interventions on maize prices levels and

Table 9.2 Evolution of maize marketing and pricing policy reforms starting in 1988

State marketing agency		Market regulation and pricing policy	
1988	NCPB financially restructured. Phased closure of NCPB depots. NCPB debts written off; crop purchase fund established but not replenished	1988	CSRP envisages widening of NCPB price margin. In fact margin narrows. Proportion of grain that millers are obliged to buy from NCPB declines. Limited unlicensed maize trade allowed
		1991	Further relaxation of inter-district trade
		1992	Restrictions on maize trade across districts re-imposed. NCPB unable to defend ceiling prices
		1993	Maize meal prices deregulated. Import tariff abolished
1995	NCPB restricted to limited buyer and seller of last resort role. NCPB market share declines to 10–20% of marketed maize trade. NCPB operations confined mainly to high-potential areas of western Kenya	1995	Full liberalization of internal maize and maize meal trade; maize import tariff re-imposed to 30%
		1996	Export ban imposed after poor harvest
		1997	Import tariff imposed after poor harvest
		1997–onward	External trade and tariff rate levels change frequently and become difficult to predict. NCPB producer prices normally set above import parity levels
2000–onward	NCPB provided with funds to purchase a greater volume of maize. NCPB's share of total maize trade rises to 25–35% of total marketed maize	2005–onward	The government withdraws the maize import tariff from maize entering Kenya from EAC member countries. An official 2.75% duty is still assessed. Import duty of 35% still assessed on maize entering through Mombasa port

Source: Authors.

volatility; (iv) the income distributional effects of government policy interventions; (v) trends in the vertical margins between wholesale maize grain prices and retail maize meal prices; and (vi) trends in maize–fertilizer price ratios, as an indicator of incentives for input intensification.

The Importance of Maize in Smallholder Agricultural Production and Marketing

The structure of the small-scale farm sector is revealed through nationwide survey data on smallholder households from the 2003/04 production year. Table 9.3 presents the production and market share of the range of crops and animal-rearing activities in the small-scale sector, which gives a view of the relative importance of particular activities. Over 98 per cent of small-scale farmers cultivate maize, and this crop accounted for 21.3 per cent of the total value of measured agricultural output in 2003/04. Slightly over 45 per cent of the maize produced was sold although a small proportion of smallholder farmers account for most of the marketed maize sales. Beans, oilseeds and groundnuts collectively account for less than 5 per cent of the total value of small-farm agricultural output, as do other cereals (primarily wheat and sorghum), and coffee. Cassava and potatoes account for only 5 per cent of the total value of smallholder agricultural output. Tea and sugarcane account for 11 and 8 per cent of total smallholder farm production, respectively.

Table 9.3 also reveals how important both dairy and horticultural crops are. Over two-thirds of smallholder farmers derive income from dairy. The value of output from milk production now exceeds that of maize, accounting for over 23 per cent of the total value of smallholder farm output. Over 40 per cent of smallholder farmers sell milk, a higher proportion than for maize. Fresh fruits and vegetables also appear to have become of major importance to small-scale farmers, accounting for 17 per cent of the total value of smallholder farm output. Just under 98 per cent of farmers grow some horticultural crops and 74 per cent sell horticultural crops. Maize still accounts for the greatest overall use of land in the smallholder sector, but clearly its role in crop production and marketing has been declining over the past decade. This might signal a shift in smallholder cultivation towards higher-value, higher-return activities that make greater use of scarce land and labour.

Despite the increasing importance of other farm activities, improving the productivity of maize has major potential to catalyse smallholder farm productivity and income growth. Virtually all smallholder farmers grow maize which accounts for a sizeable fraction of total area under cultivation, is an input into the animal industry and other agricultural activities,

Table 9.3 Total production, on-farm consumption, and marketing of annual crops, small-scale farm sector (2003/04)

Crop	% of households cultivating	Value of production (US$)	Share of total value of output	% of households selling	Sales value (US$)	Sales as % of production
Maize	98	378,076	21.25	36	173,584	45.9
Other cereals (excluding maize)	50	84,031	4.57	16	78,824	75.8
Beans, groundnuts, oilseeds	96	80,960	4.34	30	25,609	31.6
Roots and tubers	81	93,792	5.02	31	38,736	41.3
Non-traditional cash crops[1]	7	10,152	0.54	4	6,960	68.6
Sugarcane	12	159,802	8.56	10	159,802	100
Tea	13	206,933	11.08	13	205,837	99.6
Coffee[2]	23	75,067	4.02	20	73,483	98.7
Fruits and vegetables	98	319,241	17.10	74	192,515	60.3
Coconut and cashewnut	4	7,122	0.38	3	4,539	63.7
Milk	67	431,493	23.11	42	224,583	52.0
Eggs	73	220	0.01	na	220	100
Live animals	93[3]	na	na	na	126,033[4]	na

Notes:
1. Non-food cash crops: commercial trees, cotton, sisal, pyrethrum, flowers, tobacco, sunflower and miraa.
2. Figures based on 1997/98 completed payments.
3. Percent owning livestock.
4. Net sales of live animals.

Source: Egerton University/Tegemeo Institute rural household surveys, 2003/04.

and is likely to play a central role in a well-formulated rural growth and poverty reduction strategy.

Maize Yield Trends

There is a widespread perception that maize has suffered from declining yields since the 1990s when market liberalization programmes were partially adopted and that market liberalization is largely responsible for the reduction in yields. The perception is based on the fact that the operations of the NCPB, which were primarily designed to support maize price levels in maize-surplus areas of the country, have been scaled down since the mid-1990s. Real maize prices have declined over the past 15 years but the evidence of declining maize yields is suspect, and available nationwide household panel survey data actually indicates the reverse.

National maize yield trends based on Ministry of Agriculture estimates are not based on survey data but on the 'best guesstimates' of local agricultural extension agents and then aggregated to the district level and then to the province and national levels by Ministry of Agriculture authorities. The official national estimates show that after rising impressively between 1965 and 1980, maize yields have largely stagnated over the past two decades.

However, a major neglected point is that the proportion of maize area under intercropped land has increased dramatically since the early 1990s. According to nationwide household survey data in 1997, 2000 and 2004, the proportion of total maize area under monocrop cultivation has declined from 22.8 per cent in 1996/97 to 13.1 per cent in 1999/00 to 8.7 per cent in 2003/04 (Ariga, 2007). The proportion of total maize fields with two or more other crops on them has risen dramatically, from just under 30 per cent in 1996/97, to almost 75 per cent in 2003/04. The trend towards increased maize intercrop cultivation and lower maize monocrop cultivation is being driven by declining farm size, the retreat of the NCPB from maize purchases at above-market prices, and improving market conditions for fresh fruits and vegetables, roots and tuber crops, and other crops commonly intercropped with maize.

However, national estimates of maize area by the Ministry of Agriculture do not differentiate between maize area under monocrop and intercrop. Maize yields on intercropped fields are lower than those on monocropped fields. Hence, due to the manner in which national area and production statistics are estimated by the Ministry of Agriculture, shifts in maize area from monocrop to intercrop during the 1990s and early 2000s could downwardly bias true maize yields, because they do not account for the increasing share of maize area that is intercropped with other crops. Nationwide field-level panel data indicate that both monocrop and intercrop yields have been generally rising between 1997 and 2004 (ibid.), that the proportion of smallholder households applying fertilizer on maize has been rising steadily since the mid-1990s, and that the fertilizer dose rates among those applying has similarly been rising.

Price Trends

Maize grain prices in Kenya are among the highest in the Eastern and Southern African region. Mean wholesale market prices in the major surplus zone of Kitale and the capital city, Nairobi, between January 1989 and December 2005 have been \$160 and \$197 per tonne, respectively, considerably higher than world market levels.

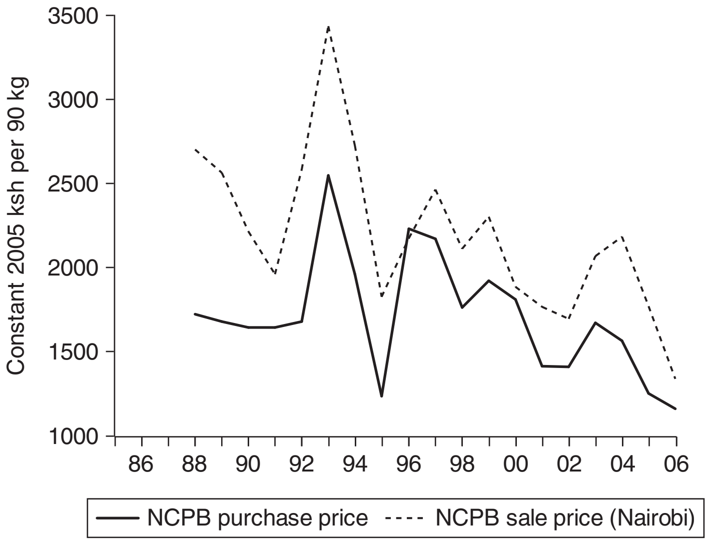
The NCPB still continues to exert a major indirect effect on maize prices and therefore smallholder welfare. Jayne et al. (2008) estimated both the separate and joint impacts of the NCPB's purchase and sale operations on wholesale prices in Kitale, a maize surplus region and Nairobi. Their results indicate that, between 1995 and 2005, the NCPB's operations have raised wholesale market prices by 17–20 per cent. Over this period, the NCPB has cumulatively purchased 30 per cent more grain from farmers than it has sold to millers and other domestic buyers. Hence the NCPB's operations have tightened the supply–demand balance in domestic markets, which had a price-raising effect on wholesale markets. Second, the NCPB has generally set its purchase prices above those in domestic markets, which also would put upward pressure on local market prices.

Jayne et al. (ibid.) also found that the NCPB's activities reduced the standard deviation and coefficient of variation of market prices, consistent with its stated mandate of price stabilization. It has successfully raised market prices in bumper crop years and exerted downward pressure on market prices in drought years, mainly through its price-setting operations. However, the costs involved in achieving this improvement in price stability are not available, and hence welfare effects cannot be derived.

In recent years, the NCPB has slowly reduced in real terms its maize purchase and sales price over time. The declining trends in real NCPB maize purchase and sale prices are shown in Figure 9.2. This is evidence that, over time, the NCPB is partially retreating from attempts to push market prices substantially above what their equilibrium levels would be without the involvement of the NCPB.

There has also been a very close correlation in real price movements between the NCPB purchase price (primarily operative in the surplus areas of western Kenya) and the wholesale market prices in these areas of western Kenya. Likewise, there was a fairly strong trend relationship between the NCPB's sale price (operative mainly in urban areas where millers buy from the NCPB at this price) and wholesale maize prices in urban areas.

Wholesale maize prices were very high in the early 1990s (equivalent to over \$220 per tonne in Nairobi) when the NCPB was still purchasing between 3 and 6 million tonnes even after the liberalization programme



Note: Prices are mean of monthly prices from the marketing year (July–June); e.g., 1999 is from July 1999 to June 2000. Sales prices were pan-territorial until 2004, after which the NCPB publishes province-specific prices. Sales prices shown here are for Nairobi and Central Province. Purchase prices remain pan-territorial.

Source: NCPB (2007).

Figure 9.2 Trends in real NCPB maize purchase and sale prices, 1988/89 to 2006/07 marketing years

had began. However, after the NCPB's purchases declined sharply starting in 1995, real wholesale maize prices have declined as well. Mean real prices in the 1995–2004 period have been lower by 25 per cent in Eldoret, by 30 per cent in Kitale, and by 29 per cent in Nairobi, than during the 1985–94 period. Time-trend regressions indicate a statistically significantly down trend in the inflation-adjusted prices in most markets between 1985/96 and 2003/04.

Effects of NCPB Maize Policies on Smallholder Farmers and Consumers

The NCPB's estimated influence on maize price levels can be combined with data on the pattern of maize purchases and sales from household-level surveys to draw inferences about the distributional consequences of government maize price policy. Nationwide farm household surveys implemented during the 1990s and early 2000s consistently indicate that the majority of rural farm households in Kenya are net buyers of maize, who tend to be the relatively smaller and poorer farms. By contrast, roughly 20 per cent of farms (generally larger) account for the majority of the maize marketed nationwide (Table 9.4). This survey evidence indicates that the first-order effects of the NCPB price-raising operations over the past decade have been to transfer income from maize-purchasing rural households and urban consumers to larger maize-selling farms. This conclusion is consistent with the findings of Mghenyi (2006) and Mude and Kumar (2006), who independently used different years of the same household panel dataset to estimate the effects of maize price changes on rural poverty. Mghenyi's study found that a 20 per cent reduction in maize market prices would reduce rural headcount poverty rates and transfer income from a relatively small proportion of maize-surplus farmers to the majority of farmers in rural Kenya. Mghenyi's analysis takes into account these second-order effects by considering both adjustments in production and consumption, and the accompanying responses on the rural wage labour market, using dynamic stochastic dominance tests. Mghenyi finds that the second-order effects are relatively small, meaning that the impacts of higher maize prices are much larger than the impacts of greater agricultural wage labour income on the welfare of net purchasing households. For this reason, the findings of Mghenyi and Mude and Kumar are very similar, that is, that most rural households, and especially the rural poor, are adversely affected by relatively high maize prices.

Another apparent trend since 1995 is that smallholder crop production patterns and income sources have become more diversified. Table 9.5 shows mean household income shares in the late 1990s, by region. Household income estimates consist of crop, livestock and off-farm income. Off-farm income is composed of remittances, pension and wages from working on other farms (*kibarua*). Crop income (the value of crop production) accounts for 45 per cent of total household income nationwide, but this varies greatly by region. The right-hand section of the table shows the decomposition of crop income shares by crop. Here we see that maize accounts for 15 per cent of total mean household income shares across the entire sample. However, in the high-potential maize zone, maize accounts for 27 per cent of mean household income. Although we do have comparable household data from the pre-liberalization period to compare this to, evidence presented below indicates that maize accounted for a substantially higher proportion of total cropped area and farm income, both in the high-potential maize zone, and nationwide, prior to liberalization, which would suggest that some diversification out of maize has already occurred after the NCPB started reducing the amount of maize it purchased since 1995.

Table 9.4 *Household characteristics according to position in the maize market, nationwide sample of small-scale households in Kenya (pooled data, 1997, 2000 and 2004)*

Characteristics	Maize marketing position						
	Sell only (n=781)	Buy only (n=2052)	Net seller (n=467)	Net buyer (n=242)	Net equal (n=18)	Neither buys nor sells (n=412)	Total (n=3972)
% of total sample	19.7	51.7	11.8	6.1	0.5	10.4	100
Household income (2004 ksh per hh)	334,188	175,409	275,006	184,375	243,950	213,775	223,176
Crop income (2004 ksh per hh)	182,093	86,702	153,616	90,908	157,080	102,893	115,580
Household wealth (2004 ksh per hh)	273,390	58,662	118,840	61,862	31,590	110,435	113,401
Land cultivated (acres)	7.5	2.6	4.8	3.0	2.4	3.6	4.0
Household size (adult equivalents)	6.2	6.2	6.2	6.3	6.9	5.8	6.2
Female-headed households (%)	12	49	7	16	5	11	100

Source: Tegemeo Rural Household Surveys, based on nationwide sample of 1,324 rural farm households surveyed in 1997, 2000 and 2004.

Table 9.5 Crop income share (including for home consumption) by land size tercile (pooled data 1997, 2000 and 2004)

	Off-farm income share	Livestock income share	Crop income share	Income share for specific crops						
				Maize	Other grains	Coffee/ tea	Sugar-cane	Horti-culture	Dry beans/ peas	Roots/ tubers
Coastal Lowlands	70	8	22	6	0	0	0	11	1	4
Eastern Lowlands	50	17	33	7	0	1	1	16	5	3
Western Lowlands	41	16	43	15	7	0	5	4	5	7
Western Transitional	23	19	58	13	1	0	19	16	3	6
High-potential maize zone	26	27	47	26	5	4	0	6	5	1
Western Highlands	26	19	55	16	1	7	0	25	4	4
Central Highlands	29	23	48	5	0	17	0	19	1	6
Nationwide	37	19	44	13	2	4	3	14	4	4

Note: Off-farm income includes own business income, salaries and wages, remittances, and labour income from work on other farms. Livestock income refers to gross sales value of animals and animal products. Crop income refers to the gross value of crop production.

Source: Egerton University/KARI/MSU Rural Household Survey, 1996/97 and 1997/98 seasons.

One of the questions asked of farm household respondents in the 1997 and 2000 Tegemeo surveys concerns the perceived welfare effects of maize price levels. The question was: 'Is your household better off with high or low maize prices?'. Maize prices for the previous season (1996) were used as a reference point; 1996 was a year of relatively low maize prices throughout the country. The results show that about 67 per cent of all households surveyed preferred maize prices lower than those prevailing in their location in 1996, and these figures mirror very closely the proportion of households in each zone that are net maize buyers. The preference for lower maize prices was particularly evident in the low-potential areas such as Western Lowlands and Coastal Lowlands, but also in relatively high-potential but grain-deficit areas such as Western Transitional and Marginal Rain Shadow. Only in the high-potential maize zone did the majority of households state a preference for higher maize prices than in 1996, and this is clearly because the majority of rural households in this particular zone are net sellers of maize.

Another perception question asked in the Tegemeo household survey concerns how small farm households reported being affected by the cereal market and pricing reforms in the 1990s. Respondents were asked the following two questions: (i) 'The government has liberalized the maize market since 1992. Compared to 5–10 years ago, is it now more convenient or more difficult to sell your maize?' and (ii) 'Overall, would you prefer to go back to the controlled grain marketing system as it existed in the 1980s or do you prefer the current liberalized marketing system?'. The first of these questions was asked only in 1997, while the second question was asked both in 1997 and in 2000.

Perhaps surprisingly, in spite of the fact that grain wholesale prices have declined during the post-liberalization period, the overwhelming majority of households in all regions (88 per cent) stated that it was more convenient to sell grain since liberalization (even though most of them did not sell).There are two reasons for this. First, most traders buying maize now pay cash immediately at the time of the transaction, in contrast to sales to the NCPB, which often took months to pay farmers. Second, most farmers are now able to sell their grain at or very near the farm premises. Just under 70 per cent of farmers selling maize sold to traders who collected the grain from their village (Argwings-Kodhek, 1998). Because of increased activity by assemblers, brokers and wholesalers in rural areas, farmers have less difficulty arranging for transport to move their maize from farm to market.

Concerning households' overall preferences for the controlled marketing system versus the current liberalized system, responses to this question are for the most part consistent across the two years (1997 and 2000).

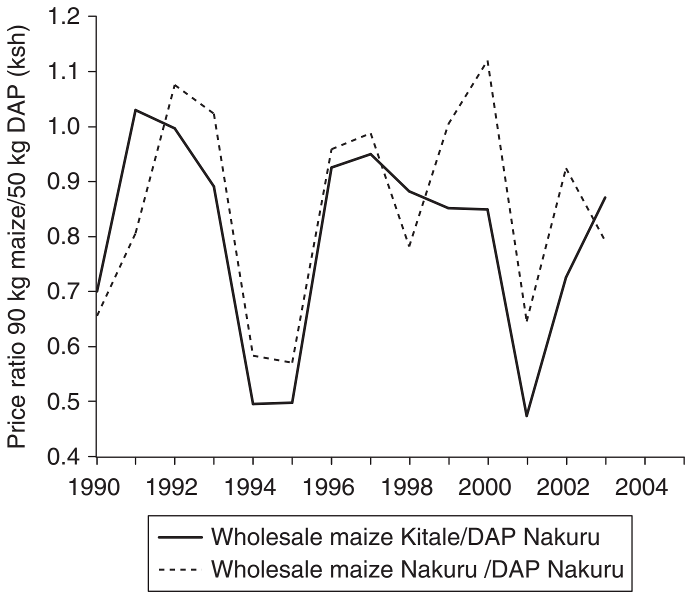
Overall, 61 per cent of households stated a preference for the current liberalized system in 1997, and this rose to 66 per cent in 2000. The per centage of households preferring the marketing arrangements of the pre-liberalization period declined from 34 per cent in 1997 to 32 per cent in 2000. As with the previous questions, the preference for the current liberalized system was strongest in the grain-deficit areas such as Central Highlands, Coastal Lowlands, Eastern Lowlands and Marginal Rain Shadow. By most accounts, it is easier now to purchase grain in these deficit areas. Formerly, during the control period, prohibitions on the private movement of maize across district boundaries made it very difficult to purchase grain in the deficit districts after local production was exhausted. These areas were therefore dependent on more expensive commercially produced and distributed maize meal. After liberalization, grain could flow directly from surplus to deficit areas, and this has provided the majority of rural households with the ability to source grain more cheaply than before.

In the western transitional zone (Kanduyi division of Bungoma District and the Kabras and Mumias divisions of Kakamega District), there appears to be a strong shift in perceptions about the liberalized marketing system. The proportion of farmers preferring the current system rose dramatically between 1997 and 2000, from 37 to 63 per cent.

Margins between Wholesale and Retail Prices

Importantly, most households have seen that liberalization has improved the availability of maize grain in rural areas and has reduced the real price of maize meal. Since most rural households are buyers of maize and/or maize meal, the decline in maize marketing margins and maize meal prices has been a major benefit to many rural households. Jayne and Chapoto (2006) show that since the inception of the market reforms in the 1990s, the marketing margins between wholesale grain prices and retail maize meal prices has declined substantially.

How has increased competition at the processing or milling stages reduced maize meal prices for consumers? Prior to liberalization, a few officially registered maize-processing firms had a de facto oligopoly on milling maize and supplying the retail sector. Regulations made it difficult for non-registered millers and traders to transport grain into urban areas or acquire grain from the marketing board. Market reform opened this system to greater competition as small millers and retailers who were previously excluded from entering the market were now allowed to procure and transport grain freely across district boundaries. The marketing reforms induced rapid investment in medium- and small-scale milling and



Source: Ministry of Agriculture data files.

Figure 9.3 Price ratios, wholesale maize/DAP fertilizer at Nakuru (ksh 90 kg maize / ksh 50 kg fertilizer)

retailing networks. In response to greater competition, the registered large milling companies have reduced their margins in an attempt to regain lost market share. Increased competition at the milling and retailing stages of the maize value chain has greatly benefited low-income consumers in Kenya.

Trends in Real Maize–Fertilizer Price Ratios

Based on the foregoing, one might speculate that real maize market prices would have declined since the liberalization process began, commensurate with the decline in NCPB maize purchases over time. Indeed this has been the case. Yet despite the decline in maize prices over the past 15 years, there have been important efficiency improvements in the fertilizer marketing system that have maintained farmers' incentives to use fertilizer. Figure 9.3 presents the maize–fertilizer price ratio for di-ammonium phosphate (DAP) at Nakuru. The price ratio is highly variable across the period, but it does not exhibit a downward trend even though real maize prices have declined. Since the introduction of fertilizer market reform in the early 1990s, the price differences between Mombasa and Nakuru have declined substantially. Mean fertilizer marketing margins have declined by $69 per tonne between the early 1990s and the early 2000s, a 40 per cent reduction. Innovations and intense competition in Kenya's fertilizer importing and wholesaling stages have maintained incentives for Kenyan farmers to use fertilizer despite a rise in international fertilizer prices and a secular decline in wholesale maize prices during the 1990–2004 period (Ariga et al., 2006).

Both the proportion of smallholders applying fertilizer on maize as well as the intensity of fertilizer use on maize fields has increased in Kenya since the maize and fertilizer market reforms in the early 1990s. The nationwide study of 1,313 smallholder households surveyed across four years between 1995/96 and 2003/04 by Egerton University's Tegemeo Institute shows that fertilizer use per hectare of maize cultivated has increased dramatically in all but the semi-arid parts of the country. Over 70 per cent of small-scale farmers in the high-potential maize zones of western Kenya now use fertilizer on maize, with some averaging dose rates of roughly 163 kg per hectare, higher than mean levels obtained in South and East Asia. The intensity of fertilizer use on maize has increased in spite of cutbacks in maize price supports by the government. However, fertilizer use remains limited in the drier regions because of low profitability, and fertilizer use levels remain relatively low among the poorest smallholder households.

5 ALTERNATIVE POLICY AND PUBLIC INVESTMENT OPTIONS FOR PROMOTING MAIZE MARKET PERFORMANCE

This section identifies challenges for maize productivity, marketing and trade policies. The section also analyses opportunities and challenges for supporting a more market-based grain marketing system in Kenya.

Maize Productivity Growth and Value Chain Development

Although there has been strong production growth in dairy, tea, fresh fruits and vegetables, the overall performance of Kenya's agricultural sector has been dragged down by slow productivity growth in maize, which accounts for the single largest share of cropped area in the small farm sector.[3] Achieving productivity growth in this staple crop is likely to be a prerequisite for broad-based and pro-poor agricultural growth in Kenya.

Kenya's agricultural ministries have developed a sector-wide strategy (the Strategy for the Revitalization of Agriculture: SRA) to comprehensively address the many issues that determine domestic crop and livestock production. However, the SRA largely sidesteps the most fundamental policy problems of how to reduce the sources of uncertainty and the discretionary government behaviour that depresses private investment in the sector, especially at the wholesaling stage, and impedes the development of a more efficient and stable system. In particular, the SRA does not effectively address the coordination problems affecting the crucial middle stages of the maize value chain. For example, the NCPB has a grain storage capacity of 28 million bags of maize (2.5 million tonnes), but remains largely underutilized with the current use of about 13 per cent. Yet in other areas, there is a critical shortage of grain storage facilities. Producer prices after harvest are likely to be depressed by the inadequacy of storage in urban areas, but private investment in grain storage is impeded by uncertainty of government behaviour with respect to NCPB pricing and marketing operations, variable import tariff rates, and the future disposition of public storage facilities.

One option for the NCPB that could be politically acceptable is to propose that the NCPB offer a floor price equal to some percentage (say 60 per cent) of the landed cif cost of importing maize in each district where the NCPB operates. The import reference point could be specified as the minimum of Mombasa, eastern Uganda, or northern Tanzania. Thus, if the least-cost source of importing maize to Eldoret was $250 per tonne via eastern Uganda, then the NCPB Eldoret producer price would be $150. This is somewhat less than historical average market prices in the area. By choosing a percentage rate that is sufficiently low, the floor price may not come into play in most years, but would have the benefit of providing a real floor price in a good harvest season that might otherwise cause prices to plunge to very low levels. NCPB selling prices would be transparently set by a formula such that all actors in the marketing system would be able to know with certainty how NCPB producer and sale prices will change according to changes in regional market conditions.

The point of this illustrative proposal is to provide some transparent process for determining NCPB purchase and sales prices, to reduce the uncertainty in the market, remove the discretionary dimensions of NCPB activities, and set floor prices at such a level as to become operative only in good production years when prices are likely to go below levels that would provide a profitable return for reasonably efficient farmers.

Opportunities and Challenges for Supporting a More Market-based Grain Marketing System

Nurture the development of risk-shifting market institutions

Despite the potential for using market-based instruments to manage food sector risks, there has been little use to date of these instruments in low-income countries for a number of reasons. Contract enforcement is difficult for food staples in times of local shortage. Basis risk is another major impediment to both futures and options trading and index-based weather insurance. One of the most serious impediments to the development of risk management markets for food sectors in many countries is continuing government interventions in food markets. These policies reduce or destroy the incentive to participate in market-based risk management mechanisms because there is no incentive to manage risk when prices are being effectively stabilized via policy, and because such policies tend to disconnect local prices from world prices which reduces the hedging potential of the global markets. Furthermore, if government interventions are discretionary and difficult to predict then they can add another layer of risk that individuals and firms may find difficult to hedge using available market-based risk management instruments.

A more transparent and consultative framework for public–private sector dialogue

The dialogue should move towards greater coordination and predictability in government behaviour. Regular consultative meetings between the Ministries of Agriculture and Finance, millers, traders, farmer lobby groups and other stakeholders in the sector can build trust and communication between the public and private sectors that is needed to reduce market risks and promote long-term investment in the system.

Public good investments to support the development of food markets

Markets require investments in public goods to function effectively – roads, rail systems, port facilities, solid regulatory frameworks to support the development of transport, communication and financial services, crop science and farm extension services to help farmers increase surplus production, and fuel market expansion. Much of the problem with food price instability and the price slumps that often accompany output supply expansion is inelastic demand, that is, small changes in output have large effects on price levels. Governments can play a critical role to support small farmer productivity growth by supporting the development of well-performing markets through public goods investments. Public investments that have a proven track record in terms of enhancing crop productivity include agricultural crop research and development (Howard and Mungoma, 1996; Oehmke and Crawford, 1996; Byerlee and Eicher, 1997; Alston et al., 2000), investments in physical infrastructure to reduce marketing costs (Antle, 1983), and well-structured extension programmes (Evenson and McKinsey, 1991).

Streamlining regulations and trade barriers for international trade

Regional trade, in combination with good transport infrastructure between countries, has the potential to expand the size of the market, increase the elasticity of demand facing farmers, and reduce price instability. Local production shocks can be mitigated by regional trade, which tends to stabilize markets by linking together areas with covariate production. During the Moi era, Kenya frequently varied its maize import tariffs in an unpredictable manner. These trade barriers made it risky for trading firms to invest in developing durable marketing networks across regions. Customs clearance procedures are often cumbersome. For example, permits to legally import grain into Kenya are available only in Nairobi (Nyameino et al., 2003). These regulatory barriers impose transaction costs on traders which results in lower demand and lower prices for farmers. Streamlining the regulatory processes for regional trade can reduce downside price instability that often depresses farmer incentives to sustain their use of productivity-enhancing cash inputs.

Warehouse receipt systems

Warehouse receipt systems offer another alternative for facilitating private storage, as well as helping farmers and traders get better access to formal credit markets and improving the efficiency of the food marketing system in general (Lacroix and Varangis, 1996; Coulter and Onumah, 2002). Warehouse receipts are already widely used in grain marketing systems around the world to provide secure collateral for credit and as an instrument for delivering traded commodities. To be successful, these systems must have an effective system of grades and standards in place, have sufficient trust, integrity and quality control that there is essentially no default risk in using them, and have regulatory procedures and oversight to ensure the integrity of the system. South Africa has developed a substantial warehousing industry for agriculture but such services are in very short supply in other Southern African countries. Government has an important role to play in ensuring the integrity of the system.

Turning some grain marketing board silos and go-downs into storage leasing operations

The current situation is characterized by a general shortage of storage space for grain, especially in urban areas, but little incentive for investment in commercial storage. Further study could identify the potential for farmer groups or traders to rent out storage space under 10–15-year leases. Leases of this time length are generally required to allow traders to recoup the costs of the required rehabilitation investments to make the silos operational again. Greater storage facilities, coupled with better financing arrangements, could help the commercialized grain marketing system to defend itself against downside price risk.

Supporting the development of rural financial markets to improve traders' capacity to absorb surplus production

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

Changing the boards' longstanding practice of setting pan-seasonal buying and selling prices if their operations are to continue as part of a transition strategy

By offering pan-seasonal prices, the boards eliminate incentives for farmers to store grain after harvest or to invest in storage facilities. It also reduces the incentives of wholesalers and millers to invest in adequate storage facilities, since they can buy from the boards at the same price throughout the year.

Work with the World Food Programme and bilateral food aid donors to develop mutually beneficial policies towards food aid (and subsidized non-commercial imports)

While local farmers are generally well served by regional trade, their interests can be undermined by subsidized food imports, particularly if this alters long-run food consumption patterns. For example, large processing companies in urban areas are often able to acquire subsidized wheat and rice from international sources, which over time, influences urban consumption habits. The importation of subsidized wheat and rice undermines long-term demand and prices for the main staple grains, roots and tuber crops that small African farmers produce.

Consider developing specific risk-management marketing arrangements where feasible

Market-based risk management instruments have some clear advantages for managing food price risks in low-income countries in efficient ways that allow voluntary participation. However, effective development and use of such markets is clearly not going to occur without active public policy support. There are many barriers to participation, especially for small-scale producers, traders and processors, and the public sector can play an important role in reducing these barriers and facilitating use. Direct trading of market-based risk management instruments by public food marketing agencies to hedge government liabilities is an option that could be adopted very quickly. However, this is a risky venture for the public sector. Not only does such trading require considerable information and analytical capacity but is subject to the same problems of inefficiency and rent seeking that have plagued direct public intervention in food markets in the past, especially when there is no credible commitment regarding how the gains will be spent, and the losses financed. A preferred strategy is to encourage private sector use of these markets by making long-run investments in the standard public goods relating to the enabling environment for finance and risk markets, including grades and standards, credit market development, communication systems, market intelligence systems, regulations and support for locally or regionally based commodity exchanges and insurance products. There may also be a role for policy support of market intermediaries that provide access to risk management markets for small-scale operations, particularly in the early stages of developing these markets. Perhaps most important, governments can provide a predictable policy environment that does not destroy the incentives for private individuals and firms to trade market-based risk management instruments.

6 CONCLUSIONS

Achieving productivity growth in maize is likely to be necessary but not sufficient for broad-based and pro-poor agricultural growth in Kenya. Despite official production statistics indicating otherwise, nationwide smallholder survey evidence indicates that maize yields are rising over time, as is the amount of fertilizer applied on maize. Evidence also indicates that the ability of smallholder farmers to diversify into other activities is inversely related to the cost of acquiring food from the market. The real price of maize in Kenya has declined markedly since 1995 as the NCPB has partially withdrawn from the maize market. This has coincided with strong production growth in dairy, tea, fresh fruits and vegetables. If the price of maize rises, for example, through a renewed emphasis on maize price supports and self-sufficiency, this is likely to shift some areas from other crops back to maize, and directly transfer income from net maize-purchasing households, which include most of the rural poor, to relatively large farms capable of producing a large maize surplus.

Given reasonable assumptions about the potential for future productivity gains, it is unlikely that maize will provide the net revenue on the millions of farms that are 0.5–1.0 hectares or smaller to generate much improvement in absolute household incomes, especially in the semi-arid areas. Hence, the gradual movement towards smaller farm sizes will compel households to adopt more diversified commercialization strategies capable of maximizing the value of output per scarce unit of land.

Yet maize productivity growth will remain a crucial objective. If it can be achieved, it will reduce import dependence and remain a source of dynamism and growth for both rural and urban areas in the region. For farms that satisfy the joint conditions of being located in agro-ecologically suitable areas and cultivating enough land to overcome relatively low returns per unit of land, maize will remain a dominant cash crop, as for many of the farms in districts such as Trans Nzoia, Uasin Gishu, Lugari and Nandi. For farmers in most other areas, lower costs of acquiring maize will encourage the commercialization of smallholder agriculture towards higher-valued commodities – a major source of productivity growth.

While such a shift will be central for poverty alleviation for millions of small farms in Kenya, particular in semi-arid areas, this outcome is not assured. Faster progress in bringing down both rural and urban poverty rates will depend on greater investment in the critical public goods that are preconditions for agricultural productivity growth. The government has a crucially important role to play in this process. A great deal of research evidence from Africa as well as around the world indicates that the greatest contribution that public sector resources can make to sustained agricultural growth and poverty reduction is from sustained investment in crop science, effective extension programmes, physical infrastructure, and a stable and supportive policy environment (Mellor, 1976; Evenson and McKinsey, 1991; Byerlee and Eicher, 1997; Alston et al., 2000). The treasury costs of the NCPB maize trading account in recent years are not immediately available but in the controlled marketing period of the late 1980s, they were estimated at roughly 5 per cent of Kenya's GDP (Jayne and Jones, 1997). Meanwhile, the genetic advances that were a major factor in maize productivity growth in earlier decades have waned as funding by both donors and government has declined. Rural poverty alleviation will require renewed commitment to public goods investments in these key areas. At the heart of all these issues are governance and political commitment.

Comprehensive maize policy reform is sometimes seen by policy makers as an impediment to the continued viability of maize production in western Kenya because it would involve dismantling the NCPB's ability to continue offering support prices that raise the overall maize price surface in Kenya and support maize production. In the short run, it is indeed likely that large-scale maize farmers in the North Rift would be hurt by a withdrawal of NCPB from the market. This is because the NCPB's operations generally raise the maize price surface in the country (Jayne et al., 2008). However, the costs borne by the uncertainty over future NCPB asset disposition are so great that the withdrawal of the NCPB, in the medium and long runs, would in all probability attract substantial new private investment in the wholesaling, storage and transport stages of the maize value chain, which would reduce marketing (and production) costs and reduce instability enough to make maize farming more competitive even with lower prices. The phenomenon of subsidized government intervention in the market, or the threat of it, leading to private sector inaction, is one of the greatest problems plaguing the food and input marketing systems in Kenya and the region, and doubtlessly raises the costs of maize marketing, production and coordination in the system. For example, because the government often truncates the distribution of food prices at both the upper and lower ends, stockholding is risky and there are no assurances that normal intra-seasonal price rises will occur due to the uncertainty over government action.

At the same time, however, there are some compelling reasons why Kenyan policy makers may not want to trust the market for the country's strategic food staple, especially while the international trade environment remains distorted. Historically, politicians have been concerned with the possibility of subsidized international maize and wheat entering into Kenya and undercutting the viability of local farmers. Even though there is strong evidence that most farm households as well as almost all urban households would benefit from serious reform of Kenya's maize marketing system, it is not difficult to understand how local analysts and politicians may openly wonder whether analyses funded by external donors are part of a concerted effort to gain further advantage in international markets. Such concerns have of course stiffened the public's opposition to market liberalization in many African countries. Hence, the degree of public support in Africa for meaningful policy reform in particular, and good governance in general, is likely to be influenced by the extent to which agricultural reform and good governance is approached in good faith by all in the international community.

NOTES

1. This study was commissioned and funded by the FAO, EST Division, Rome. Most of the data used in this analysis were collected under the Egerton University Tegemeo Agricultural Monitoring and Policy Analysis (TAMPA) project, funded by USAID/Kenya, and by the World Bank.
2. One other area that is being addressed by COMESA is the harmonization of food safety standards and SPS requirements. Each country has its own standards that may be different from the others and this will impose additional costs for traders who have to meet varied quality standards. The harmonization of the various standards will reduce costs for traders and raise the volume of trade. The setting of regionally harmonized quality and product standards is in progress.
3. However, as mentioned earlier, we feel that there are reasons to doubt the accuracy of official maize yield estimates in Kenya due to apparent shifts in area from monocrop to intercrop cultivation.

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10. Assessment of maize trade and market policy interventions in Malawi

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1 INTRODUCTION

The Malawian economy is predominantly rural, with agriculture contributing more than 35 per cent of gross domestic product (GDP). Agriculture is also a major source of livelihoods for more than 85 per cent of the population. Crop production accounts for 74 per cent of rural incomes and agriculture is the most important occupation for 71 per cent of the rural population.

The agricultural sector has two main subsectors. A smallholder subsector that contributes more than 70 per cent of agricultures share of GDP and an estate subsector that contributes less than 30 per cent. Maize, the main staple food, is cultivated by smallholder farmers mainly to meet their subsistence needs, with less than 20 per cent produced as marketed surplus. Maize accounts for 53.8 per cent of smallholder cultivated land and 96.4 per cent of farming households consider maize as the main staple food (NSO and IFPRI, 2002).

Since Independence in 1964, ensuring food security has been a major development goal pursued by the government primarily through self-sufficiency in food production. Food security has traditionally been defined in terms of people's access to maize. Others have described maize as 'life' (Smale, 1995). As a result, the policies towards the smallholder sector in agriculture have largely been driven by the desire to achieve maize self-sufficiency.

This chapter assesses the maize trade and marketing policy interventions pursued by the government to achieve its agricultural objectives. It describes the prevailing national agricultural policy objectives, the rationale behind the policies, and the current mix of interventions and public investments in place to achieve those objectives. The next section provides a brief context of the role of maize in Malawi. Section 3 outlines

Table 10.1 Maize in a typical diet of a rural household, 2002

Main food item	Lunch (%)	Supper (%)
Main meal		
Nsima (maize)	77.97	82.37
Nsima (cassava)	1.94	1.69
Rice	1.40	2.66
Other	8.86	8.62
No meal	9.93	4.66
No. of households	826	826

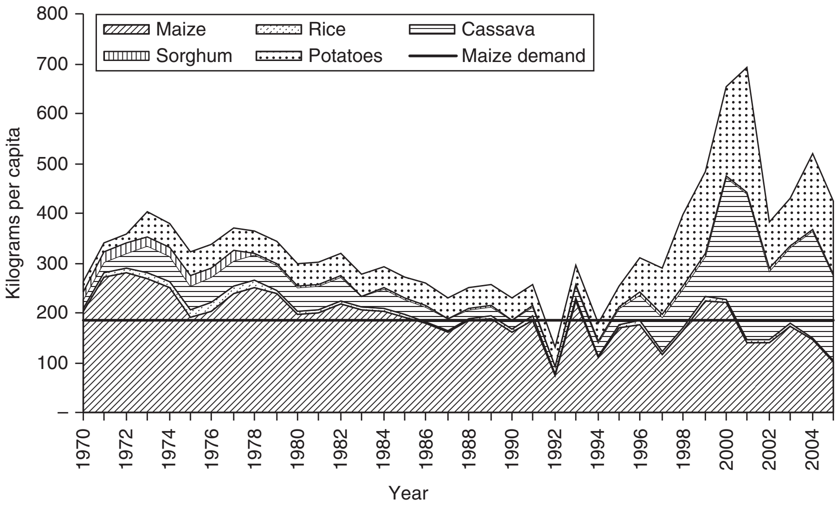
Source: Chirwa and Zakeyo (2003), based on rural survey data from the Integrated Household Survey-1.

the overall policy objectives in the agricultural sector and the centrality of maize. Section 4 assesses the performance of the existing trade and domestic policy interventions. Section 5 reflects on challenges in domestic and trade policies in the maize sector, while Section 6 offers a summary and policy recommendations focusing on alternative policies to facilitate the achievement of maize policy objectives.

2 THE CONTEXT OF MAIZE AS A STAPLE GRAIN

Table 10.1 shows the importance of maize in the typical diet of a rural household. It is apparent that *nsima*, made from maize flour, is the dominant main dish for lunch and supper. Although government has promoted alternative food crops such as cassava, rural households have not moved away from their traditional food.

In the first 15 years after Independence, Malawi was able to feed herself without requiring imports to augment domestic supply. If we assume that the minimum food requirement for staples is 185 kilograms per capita, Malawi had been self-sufficient in maize production in the 1960s and 1970s (Figure 10.1). During this period no maize imports were required to augment domestic supply. Msukwa (1994) notes that with the increase in the population since the mid-1980s, Malawi moved from a situation of national self-sufficiency in food production to recurring food deficits. The period of economic reforms has been characterized by increased imports of maize to satisfy domestic demand, partly due to poor weather conditions, low maize productivity and high population growth. In some cases, other food crops such as rice, cassava, sorghum and potatoes are bridging the national shortages in maize production and supply. Official estimates



Source: Computed from FAOSTAT data.

Figure 10.1 Trends in main food staples per capita, 1974–2005

suggest that cassava production substantially increased in the late 1990s.[2] The apparent increase in cassava production has partly been due to its promotion by government and non-governmental organizations since the late-1990s as an alternative food crop to maize. However, most households treat cassava and potatoes as snacks rather than as a meal. Although per capita food production has in recent years risen over minimum maize requirement, Malawi experiences food shortages as long as maize production is below the minimum level.

According to the World Bank (2003), per capita maize production since the early 1990s has fluctuated between 170 and 220 kilograms, with sharp declines in 1992 (67 kilograms) and in 1994 (105 kilograms). At the household level, recent surveys indicate that the average number of months of food security for rural households from own production in a normal year is between 6 and 7 months. The World Bank (ibid.) notes that food supplies in Malawi fluctuated between 1.6 and 1.7 kcal per capita per day during the 1996–99 period compared to the minimum requirement of 2.2 kcal per capita per day.

The decline in maize production began in the late 1970s and the first national maize deficit was witnessed in 1987 and the worst situation occurred in 1992. Nonetheless, it is evident that maize production in the past two decades has fallen below the minimum national food requirement for a staple. These maize shortages have led to surges in the importation of maize to meet the maize demand (Chirwa and Ngalawa, 2006). According to Aide à la Décision Economique (ADE) (2000), imports of maize have typically been between 100,000 and 150,000 tonnes during the years of shortages since 1987. At the household level, with a large proportion of rural households experiencing food shortages and relying on relief food, the National Statistical Office (NSO, 2005) finds that about 57 per cent of households reported having inadequate food consumption in 2004/05. Malawi continues to suffer from chronic food insecurity with many of the problems being structural and economic in nature (GoM, 2006).

3 AGRICULTURAL AND MAIZE POLICY OBJECTIVES

Several documents articulate agricultural and food security policy objectives in Malawi. Some of the policy objectives that have been stated remain on paper without accompanying policy actions. In some cases, there are implicit policy objectives that have not been stated but are commonly perceived to drive policy actions. One such perceived policy objective with respect to maize is the desire to minimize importation of maize and avoid the perception that the nation must 'beg' for maize from other countries. This objective is not stated but has been used to justify the implementation of the recent agricultural input subsidy programme. The agricultural policies that have been used to achieve the stated or perceived agricultural sector objectives are contained in both national development strategy documents and specific policy documents for the agricultural sector.

National Development Strategies and Agricultural Policy Objectives

In the past decade, Malawi has produced several development strategy documents with varying emphasis on the agricultural sector and maize production and marketing strategies. The main national development strategy documents include the following:

- In 1998, the government engaged in a consultative process which resulted in the publication of the Malawi Vision 2020 document which captured the long-term aspirations of Malawians. With respect to agriculture, the main objectives in Vision 2020 were to increase food crop production particularly maize, promote livestock development, reduce post-harvest losses, and improve market efficiency (NEC, 2000).

- In 2002, the government published the Malawi Poverty Reduction Strategy (MPRS) (GoM, 2002). The MPRS was highly driven by donor agencies and has largely been perceived as conditionality to access funds in the highly indebted poor countries (HIPC) initiative. The main agricultural objective in the MPRS is to increase agricultural incomes through access to inputs, technology and extension services, access to domestic and international markets, promotion of irrigation, promoting crop diversification and livestock development.
- In 2003, the government initiated another development strategy which culminated in the Malawi Economic Growth Strategy (MEGS) published in 2004 (GoM, 2004). MEGS was internally driven by the private sector following its discontent with the MPRS on the grounds that it did not address the large-scale businesses, assumed to be the main drivers of economic growth. By 2004, MEGS was receiving more public attention than the MPRS, creating uncertainty about the development strategy the country was pursuing. While the MPRS focuses on both economic and social sectors, MEGS focuses mainly on private sector-driven growth with very little attention to distributional issues. The emphasis with respect to agriculture was on export crops with little emphasis on food production and food security.
- In 2005, Malawi published its strategies on achieving the Millennium Development Goals (MDGs). Under the goal of reducing poverty, the agricultural strategies included increasing access to agricultural inputs among the poor, reducing the price of fertilizers for smallholder farmers, developing irrigation, and encouraging crop diversification and dietary diversity to reduce over-reliance on maize (GoM, 2005).
- By mid-2005, the government started the process of developing another strategy intended to integrate the MPRS and MEGS following donor pressure to harmonize the various development strategies. This led to the publication of the Malawi Growth and Development Strategy (MGDS) in 2006 which identifies five focus areas in agriculture related to maize production and marketing: increasing agricultural productivity and food varieties; increasing value addition to agricultural products by smallholders; greater emphasis on smallholder commercialization; infrastructure development; and enhancing irrigation and water development (GoM, 2006).

Agricultural Sector Strategies and Agricultural Policy Objectives

Within this broad framework of national development strategies, the Ministry of Agriculture and Food Security has also developed specific strategies for the agricultural sector:

- In 2005, the Ministry of Agriculture and Food Security produced a strategic agenda for economic development and food security. The overall objective of the strategy is to promote and facilitate agricultural productivity so as to ensure food security, increased incomes and creation of employment opportunities (MoAFS, 2005). Specific objectives included attaining household self-sufficiency in food production, increasing farm incomes, agricultural information and technologies, and expanding and diversifying agricultural production and exports.
- Another policy paper developed for the agricultural sector is the Food and Nutrition Security Policy whose objective is to improve the food and nutrition security of the population of Malawi (MEPD, 2005). The strategies for achieving this objective include increasing access to agricultural credit, access to agricultural inputs, promotion of appropriate technologies, promoting domestic and international agricultural trade, promoting food diversity and coordination of food aid.
- There is also a Crop Production Policy (MoA, undated) whose objective is to promote increased and sustainable production of both food and cash crops so that self-sufficiency in food is maintained. This is expected to be achieved through, *inter alia*, adoption of appropriate technologies, diversification of food and cash crops, promotion of markets, improving access to credit and agricultural inputs, and processing and preservation of food crops.

Apart from these policy documents, there are numerous related documents addressing issues of agricultural development including: Livestock Production Policy, Land Policy, National Fertilizer Policy, Sustainable Development Policy, Land Use Policy, Irrigation Policy and Development Strategy, Water Policy, and Integrated Industry and Trade Policy (MoAFS, 2006).

The proliferation of agricultural development strategies in the past decade has led to policy incoherence. Scarce time and resources have been spent on reviewing and refining these documents, with very little policy action taken to implement the strategies.

Rationale behind Agricultural Sector Objectives

The re-emergence of agricultural sector policy objectives, after a period of structural adjustment programmes, has been necessitated by the disappointing performance of the sector during the past two decades.

Structural adjustment programmes brought a number of reforms to the agricultural sector including the liberalization of marketing services, withdrawal of direct government marketing operations, elimination of fertilizer subsidies and government-administered agricultural credit and deregulation of crop pricing. Despite these reforms, the agricultural sector has had a largely disappointing performance. The growth rates in GDP per capita and agricultural GDP per capita were generally negative during the period of economic reform, with some improvements in the period after reforms particularly in the late 1990s. The late 1990s actually registered higher growth rates in GDP per capita and agricultural GDP per capita than the positive growth rates witnessed in the 1970s.

The poor performance of the agricultural sector has manifested in low growth rates in agricultural value added per capita, recurring food shortages with resultant high malnutrition rates and poverty, increased dependency on maize food aid and maize imports. Several factors have been attributed to the poor performance of the agricultural sector, including low agricultural productivity particularly for maize, exogenous weather shocks, low application of fertilizers, low adoption of improved seed varieties for maize, imperfect markets, and declining government support towards the agricultural sector (Chirwa, 2007). The government has reaffirmed that maize is at the core of its agenda with the primary aim of reverting the country from a net importer of the staple (maize) into self-sufficiency and even exporting to the region and beyond.

4 PERFORMANCE OF CURRENT MAIZE TRADE AND MARKET INTERVENTIONS

Since Independence in 1964, agricultural policies have focused on the promotion of food crop production among smallholder farmers and cash crop production among estate owners. Smallholders were historically restricted from growing certain cash crops – particularly burley tobacco. However, in 1995 the government liberalized production of cash crops through the repeal of the Special Crops Act. As a result, smallholder farmers have become important producers of burley tobacco, accounting for more than 70 per cent of national output and almost one in every five households now cultivate tobacco (World Bank, 2003). The liberalization of burley tobacco production by smallholder farmers was seen as one of the strategies to promote household food security through raising incomes. Improvements in incomes from participation in high-value cash crops despite its potential to shift more land away from food crop production was envisaged to help households buy food from the market (MEPD, 1995; Harrigan, 2003).

Table 10.2 presents a chronology of the major changes in maize policy. There was more state intervention in the maize grain sector prior to structural adjustment programmes in 1981. Over time there has been progressive, though hesitant, liberalization in the maize sector.

Current Domestic and Trade Policy towards Maize

Interventions in maize production

Malawi has a long history of intervention in maize production processes, ranging from subsidization of inputs, to provision of targeted free inputs, provision of agricultural credit, funding for technology development, provision of extension services, and provision of agricultural marketing services. There has been extensive research, leading to the development of high-yielding maize varieties (Smale, 1995). This research was supported by extension services throughout the country which facilitated the adoption of new technologies (hybrid maize and application of fertilizers). However, over time government support for research and development and extension services had fallen with the declining share of agriculture in the national budget (Chirwa, 2007). In addition, the government, prior to 1990 also provided subsidized credit and inputs to the smallholder sector delivered through farmers' clubs that facilitated adoption of technologies. However, within structural adjustment programmes adopted in the 1980s there was phased removal of fertilizer subsidies, albeit with numerous policy reversals. Harrigan (2003) notes that fertilizer subsidies were reintroduced at 22 per cent in 1987, a level that was higher than that applied during the pre-reform period.

The most significant current policy towards maize production is the introduction of agricultural input subsidies in the 2005/06 season following a series of targeted input programmes since 1998. The government with the support of bilateral donors introduced a series of safety-net programmes for resource-poor smallholder farmers in the form of free maize seeds and fertilizers. These agricultural-based safety-net programmes included a 'starter pack' programme which provided free inputs to resource-poor farmers from 1998/99 to 1999/2000; the Agricultural Productivity Improvement Programme (APIP) which provides inputs on credit to resource-poor farmers in 1998; and the Targeted Input Programme in 2000

Table 10.2 Summary of major policies affecting maize marketing and trade, 1964–2007

Year	Policy actions
1964–80	Maize mainly marketed by the state agency, ADMARC
	Import and export licensing
	Control of maize prices and imposition of pan-territorial and pan-seasonal prices
	State-administered credit towards smallholder maize production and subsidies on inputs
	Extension services and research and development on maize seeds
1981–86	Commencement of structural adjustment programmes supported by multilateral and bilateral donors
	Annual adjustments in smallholder produce prices, including maize
	Annual increases in interest rates
	Periodic devaluation of the Malawi kwacha
1981–92	Periodic devaluation of the Malawi kwacha
1987–88	Liberalization of smallholder agricultural produce marketing
	Liberalization of interest rates
	Reduction in fertilizer subsidies
1989–1990	Reduction in the scope of export licensing in 1989, except for maize
	Preferential lending to agricultural sector abandoned in 1990
1991	Liberalization of marketing of agricultural inputs
	Removal of fertilizer subsidies
1994	Flotation of the Malawi kwacha and liberalization of exchange rate market
1995	Liberalization of agricultural produce prices, except for maize
1996	Introduction of a producer price band for maize
1997	Removal of all import and export licensing requirements, except for maize
	Introduction of 'starter pack' free input distribution for food-insecure households to improve maize production
1998	Devaluation of Malawi kwacha
	Introduction of the Agricultural Productivity Improvement Programme providing inputs on credit to targeted smallholder maize farmers
1999	Reduction of maximum tariff rate to 25 per cent
2000–02	Elimination of the price band for maize
	Implementation of the Targeted Input Programme mainly for smallholder maize farmers
	Export of maize by the National Food Reserve Agency, contributing to a national food crisis of 2001
	Surge in imports of maize in 2000

Table 10.2 (continued)

Year	Policy actions
2003–04	Weakening of financial position of ADMARC, resulting in failure to purchase agricultural produce from smallholder farmers
	Government announced reform of ADMARC leading to creation of two companies – one commercial and the other to undertake social functions
2006–07	Introduction of targeted input subsidies on fertilizers and improved maize seeds through a voucher system. The programme reaches about 2.8 million smallholder farmers, resulting in substantial increases in maize production
	Maize purchase and sale price setting by government enforced by ADMARC
	ADMARC weak financial position continued and unable to defend the price policy.

Source: Chirwa and Zakeyo (2006).

which provides free inputs to resource-poor farmers including cereal seeds, legume seeds and fertilizer. In the 2001/02 season, the number of APIP beneficiaries was reduced to 41,800 from 160,000 in the 2000/01 season due to the high default rate among smallholder farmers (NEC, 2002).

Since the 2005/06 agricultural season, the government has been implementing a nationwide Agricultural Input Subsidy Programme targeting 2.8 million smallholder farmers. In the 2005/06 and 2006/07 seasons, the government provided 130,000 and 175,000 tonnes of fertilizers under the subsidy programme, respectively. In addition, 4,500 tonnes of improved maize seeds were provided under the subsidy programme in the 2006/07 season. The subsidy programme is approximately 43 per cent of the total agricultural budget, with government providing more than 67 per cent subsidy on the purchase of fertilizers for smallholder farmers through subsidy coupons (ICL et al., 2007). The expectation is that this will increase food production, provided that weather conditions are favourable. The first evaluation of the 2006/07 input subsidy concluded that although there were implementation challenges, overall the programme was a qualified success, with many coupons reaching smallholder farmers and farmers using the coupons rather than offering them for sale (ibid., 2007).

The government has committed itself to continue with the subsidy programme in the short to medium terms. In order to increase farmers' access to fertilizer, the government has announced a further reduction in the subsidized fertilizer price from MK 950 per 50 kg bag to MK 900 per

50 kg bag in the 2007/08 agricultural season. The size of the programme is 170,000 tonnes of fertilizers, mainly for maize production.

There is also renewed commitment from the government to revive the extension services as complementary services to the agricultural input subsidy programme. In the 2006/07 fiscal budget, the allocation to the agricultural sector was US$121 million, almost double the level in the 2005/06 budget of which US$44.8 million was the development budget. The share of the agricultural sector rose to 12 per cent of the total 2006/07 budget and the development expenditure allocation more than doubled and constituted 13 per cent of the development budget (MoF, 2006). One activity that has been singled out as a major contributor of the increase in the recurrent expenditure in agriculture is the rebuilding of extension services that had virtually collapsed following structural adjustment programmes.

Interventions in maize milling

There is no clear policy on maize processing in Malawi. This activity has always been outside government intervention, except for large commercial agro-processing activities that were monopolized by a state grain-milling company prior to its privatization in the late 1990s. Prior to the privatization of the national grain milling industry which was owned by the government through ADMARC (Agriculture Development and Marketing Cooperation), there was a close linkage between ADMARC and the Grain Milling Company, with most of ADMARC's maize purchases being sold to its grain-milling subsidiary. However, after the liberalization of maize marketing in the early 1990s, other private milling companies entered the market and are buying maize directly from the farmers or through the maize grain traders. The de-linking of ADMARC from the Grain Milling Company has implied that the major outlets for maize purchased by ADMARC are smallholder farmers and domestic consumers who experience maize shortages during the lean season, and export markets. The current structure of the maize value chain is characterized by a formal sector that is purely private controlled, after the privatization of the state-owned company, and an informal small-scale maize-milling industry. The formal sector is highly oligopolistic, with fewer than five companies producing at a national level. The informal sector is characterized by small-scale millers offering milling services to smallholder farmers and individual households. Maize milling at the local level has always been competitive through small-scale milling operations. The privatization of the state Grain Milling Company has facilitated the entry of more than three large milling companies, with the small-scale maize mills providing fringe competition and catering for the milling needs of subsistence maize farmers.

Interventions in maize pricing and marketing

Interventions in maize pricing and marketing have been central to maize policy. Since Independence, maize has been under some form of price control or regulation. There has been very little change to this policy stance following structural adjustment programmes; price and market controls remained for maize long after they were relaxed for most other crops (Chirwa, 1998).

In 1996, the government introduced a price band for maize which ADMARC was expected to defend. ADMARC was free to determine the producer price of maize within a fixed band while the consumer price remained pan-territorial and pan-seasonal. However, due to increased marketing by private traders, it became difficult for ADMARC to defend the price band, and consequently the policy was abandoned in 2000 and the price of maize significantly increased (Chirwa and Zakeyo, 2006). The government continues to intervene in the pricing by setting the price for sale of maize particularly during the lean season and food crises. Nonetheless, the private sector is free to set buying and selling prices. However, ADMARC operations and government trade policy (for example, export bans) affect market prices and hence can introduce risks for traders that may influence their own willingness to invest. More recently, the government pricing policy is focused on setting the price at which ADMARC buys maize from farmers, while allowing flexibility for ADMARC to set prices for selling it. The policy of setting buying prices is motivated by the perception that the private sector exploits smallholder farmers by offering lower buying prices, ensuring that smallholder farmers get better returns from maize farming which in turn can promote commercialization.

Associated with the pricing policy are interventions in the marketing of maize which has been progressively liberalized, although ADMARC remains a major player. Under structural adjustment, the government abolished the monopsony power of ADMARC and liberalized the marketing of smallholder agricultural produce. The marketing of smallholder agricultural crops was deregulated in 1987 through the Agriculture (General Purpose) Act of 1987 which eliminated ADMARC's monopsony power in the domestic market. The Act required private traders to obtain a licence to engage in the marketing of crops. Nonetheless, the requirement for obtaining a licence to participate in the trading of smallholder crops was relaxed over time and private traders unofficially were increasingly trading without a licence. In 1996, licensing was no longer required for domestic marketing of smallholder agricultural crops.

Competition from private traders and the decline in subsidization from the central government further weakened the efficiency and performance of the state marketing agency, ADMARC, which had to adapt to the new marketing environment through a series of reforms including rationalization of its investment portfolio and the closing of some rural markets. There was a sharp reduction in the number of marketing establishments operated by ADMARC. In 2001, ADMARC operated only through 441 seasonal markets, 343 unit markets, 24 parent markets, 10 depots and 14 district headquarters markets (Mvula et al., 2003). ADMARC has been weakened financially, due to limited support from central government, and it has therefore not been a major player in the marketing of maize in recent times. Although it continues to implement government pricing policy by offering better prices than small-scale private traders, it hardly buys any maize from smallholder farmers due to lack of funds. ADMARC opens its markets late and it tends to quickly run out of cash to pay farmers. In the 2005/06 season, ADMARC bought maize from farmers at a government-announced price of MK 20 per kilogram while private traders were buying maize from farmers at MK 15 – MK 17 per kilogram, but only managed to buy about 70,000 tonnes.

Interventions in regional and international trade

Under structural adjustment reforms, Malawi phased out quantitative restrictions on international trade except for a few products whose restrictions are largely based on health, safety and national security reasons. Although maize is not on the list of restricted products requiring an import licence, it is subject to regulated imports. Thus, while domestic marketing of maize has been liberalized, international trade policies have remained unchanged. Maize is considered a sensitive crop in the food security equation. In most cases, importation is done by government through a tendering process. The private sector is subcontracted to import maize into the country through a government tender whenever there are expected shortfalls in its domestic supply. Once the maize is in the country, the government makes it available in all areas at a subsidized price through a well-established network. For this reason, it is very difficult for private traders to import large quantities in a private arrangement and find a market for it at a commercial price. The increases in formal imports typically occur when the domestic supply has been affected by poor harvest due to floods, drought and other natural disasters. Chirwa and Ngalawa (2006) find that the most of the import surges occur in the years when there are bad weather conditions.

In terms of tariffs, maize grain is tax free in the tariff schedule, which is consistent with the Common Market for Eastern and Southern Africa (COMESA) policy of 'maize without borders', except for the quantitative restrictions imposed on maize. The official maize trade statistics reveal that applied tariffs imposed on maize grain are zero. However, maize meal is subject to customs duty of 10–15 per cent for Most Favoured Nations if imported from outside COMESA and the Southern Africa Development Community (SADC), duty free if imported from a COMESA country, and 10 per cent if imported from SADC member countries. In all cases, maize meal imports are exempt from excise taxes and surtax. The general quality standard requirement is that the maize should be fit for human consumption. Compared with other COMESA countries, Malawi has fewer quality requirements and the standards are less restrictive (RATES, 2003). According to the World Trade Organization (WTO, 2002) Malawi applies sanitary and phytosanitary requirements, but they do not appear generally to impede imports, except for prohibitions on genetically modified food.

Similarly, the export of maize is restricted, subject to intermittent export bans and export licensing. Within the regime of export licensing, the authorities also impose intermittent export bans, particularly prompted by poor harvests. Effectively, the periods of export bans on maize are longer and only small windows exist when the export ban is lifted, because the government seldom issues export licences.[3] Thus, even when the ban is lifted, an export licence is always required for maize exports. The policy of export bans and export licensing will be continued as the government strives to avoid a food crisis similar to that in 2001 when maize exports were liberalized.[4]

Storage

Most maize is stored by households in traditional silos. The only government interventions at the local level have been in the form of extension advice on how to minimize post-harvest losses and the need to fumigate the stored maize. At the national level, the government maintains strategic grain reserves in silos located in Lilongwe, while some maize is stored by ADMARC in its market infrastructure throughout the country. The silos have a capacity of 180,000 tonnes of maize grain. The government has constructed additional maize grain silos – two in the southern region and one in the northern region. This has increased the storage capacity and decentralized the storage of maize. The government would like to store maize to ensure that it can adequately intervene if there is a crop failure in any one season, thereby reducing its potential dependency on imports. Nonetheless, there have been debates about the levels of strategic maize reserve that need to be maintained in Malawi. The international donor community views reserves as serving the purposes of safety-net interventions and that only 30,000 to 60,000 tonnes would be required, while the government would welcome a considerably larger buffer stock (Harrigan, 2005).

Performance of Domestic and Trade Policies

Agricultural input subsidy

The recent agricultural input subsidy programme has been reported to have had an immediate positive impact on maize production. The use of fertilizer and improved seeds are crucial for increased agricultural production, and the majority of poor households cannot afford to buy adequate amounts of these inputs at the market value (FEWSNET, 2007). Maize production increased from an average of 1.5 million tonnes to 2.7 million tonnes in 2005/06, the first year of the agricultural subsidy. ICL et al. (2007) note that the 2.7 million tonne harvest in 2005/06 is higher than the previous highest harvest of 2.5 million tonnes that was recorded in the 1999/2000 agricultural season. The result of this record harvest has led to reduced maize prices, and an increase in the price of *ganyu* labour, thereby increasing the real wage rates.

The estimated 2006/07 season maize production is 3.2 million tonnes, leading to a maize surplus of between 0.6 million and 1.0 million tonnes. There is little doubt that the changes in estimated maize production in the 2005/06 and 2006/07 seasons can be directly attributed to the implementation of the agricultural input subsidy. For rural households that produce maize, the low price of maize may affect their future planting decisions by diversifying into other cash crops as relative maize prices fall and will therefore tend to consume more maize from the markets than from own production.

Table 10.3 presents the strengths, weaknesses, opportunities and threats (SWOT) of the agricultural input subsidy programme. The main strength is the fact that the problem is a local solution to the problem of food shortages in Malawi. Donors were initially reluctant to support the government on the basis that subsidies have a high opportunity cost in terms of foregone investment and fears that the subsidy would largely displace commercial fertilizer purchases that many farmers might otherwise have made. However, the government mobilized resources from its operations to finance the subsidy and some of the donors that had been reluctant have financed the implementation of the programme (Chinsinga, 2007). The evidence of increased maize production has renewed donor support to the agriculture sector. The subsidy programme offers opportunities for the increased adoption of technology, especially hybrid maize seeds. However, one weakness is that there is potential for displacement of commercial sales, reducing private sector participation in agricultural input markets, particularly the small-scale agro-dealer sector (ICL et al., 2007). The other weakness is that the agricultural input subsidy programme has crowded out other public

Table 10.3 SWOT analysis of the agricultural input subsidies

Strengths	Opportunities
Greater impact on food poverty Local financing and local solution Involvement of private sector in implementation Donor support towards agriculture	Potential for increased technology adoption and testing of new ideas Avenue for renewed donor support towards agriculture Evidence-based learning and policy making Productivity improvements Sustained low maize prices or high real incomes
Weaknesses	**Threats**
Poor targeting leading to displacement of commercial sales of fertilizers Budget deficit escalation – printing unbudgeted for vouchers Crowding out other public investments in support of smallholder agriculture	Unpredictability of donors Pressure for exit strategy Changes in political leadership Poor implementation Variable benefit–cost ratio

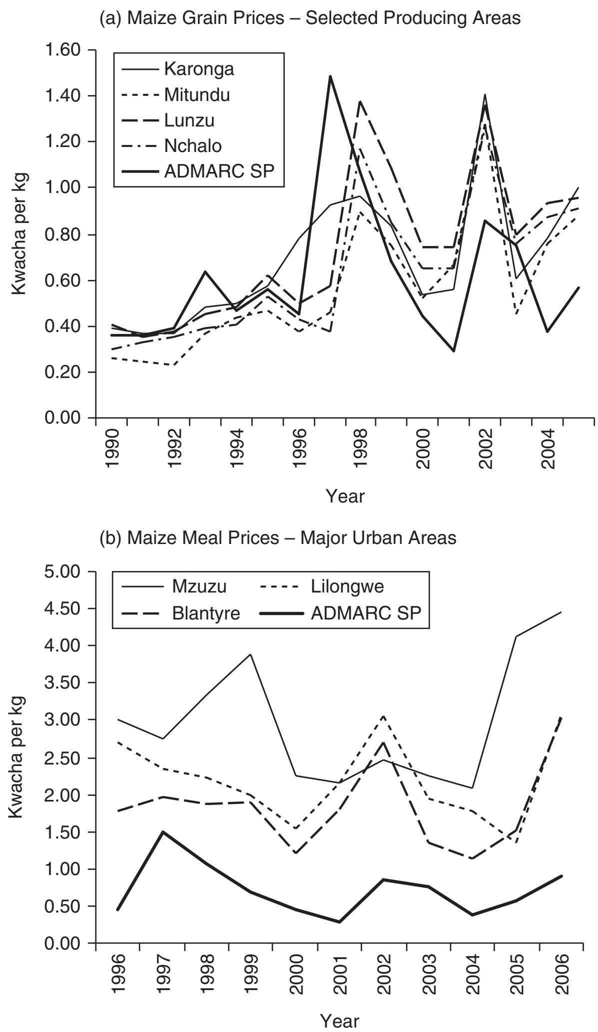
Source: Based on ICL et al. (2007).

investments that may also have raised maize production or smallholder incomes in some other way.

Maize pricing policy

The current maize pricing policy of setting the price at which ADMARC buys maize from smallholder farmers has had mixed results. The policy has benefited a few farmers that have been fortunate to sell their maize to ADMARC before it runs out of money. It has also benefited small-scale traders who bought the maize at lower prices, between MK 15 and MK 17 per kilogram, and sold it to ADMARC at MK 20 per kilogram. The setting of higher prices by the government inevitably increases the price when ADMARC is actively involved in its purchase. For instance, the maize that ADMARC procured at MK 20 per kilogram in the 2005/06 season was being sold at MK 30 per kilogram, when the private sector was selling it between MK 10 and MK 15 per kilogram.

Figure 10.2 shows trends in real maize grain and maize meal prices between 1990 and 2006. The price series show that real maize prices in Malawi have been very unstable, with large swings after 1995. Similarly,



Note: Nominal prices were adjusted using a non-food consumer price index.

Source: Computed based on Malawi FEWSNET data.

Figure 10.2 Annual real maize grain and maize meal price trends, 1990–2006

Table 10.4 Trends in spatial maize prices, 2004–2007

Statistic	2004	2005	2006	2007 (Jan–May)
Average (MK per kg)	15.72	23.61	27.34	17.70
Standard deviation	2.06	4.57	4.03	3.46
Coefficient of variation	7.64	5.17	6.79	5.12
Minimum (MK per kg)	10.30	14.63	17.05	10.67
Maximum (MK per kg)	19.35	38.62	40.99	25.27
Maximum/minimum ratio	1.88	2.64	2.40	2.37
Number of markets	40	67	68	70

Source: Computed based on Malawi FEWSNET data.

maize meal prices in selected urban areas (Figure 10.2b) also show variability over the period, and maize meal prices are much higher than the ADMARC grain selling price. The large differences in spatial prices may reflect the weak integration of maize markets in Malawi. Although Chirwa and Zakeyo (2003) found that market integration improved after pricing liberalization, spatial maize market integration remains weak. Many factors explain the weak integration of domestic markets including poor transport infrastructure, poor access to information, and the micro nature of private traders who operate within geographic areas as local monopsonists (Chirwa and Zakeyo, 2006).

Table 10.4 presents trends in spatial maize prices between 2004 and mid-2007. The average price increased from MK 16 per kilogram in 2004 to MK 27 per kilogram in 2006 and dropped to MK 18 per kilogram in 2007. However, the standard deviations of prices decreased from 4.6 in 2005 to 3.5 in 2007. With maize surpluses produced in 2005/06 and 2006/07 and an export ban still in place, the price was bound to fall significantly in most markets in Malawi. A comparison of maize retail prices between March 2006 and March 2007 shows that spatial prices fell from a high MK 68 per kilogram in March 2006 to MK 11 per kilogram in March 2007, representing about an 84 per cent drop in the price. ADMARC maintained the buying price of MK 20 per kilogram for the 2007 harvest. With the bumper harvest, prices were bound to be lower than the previous season and given its financial difficulties ADMARC was unlikely to be able to defend this price.

Examination of retail maize prices compared to ADMARC buying and selling prices indicates that there are periods in which the retail price in the 2006/07 season fell below the buying price set by the government enforced by ADMARC. This implies that private traders were buying maize from

Table 10.5 SWOT analysis of the maize pricing policy

Strengths	Opportunities
Protects smallholder maize producers who are often exploited by private traders Offers stable information for farm household planning Offers stable price for consumers	Opportunities for stabilizing maize consumer prices and increasing the income of smallholder farmers Policy coordination with other agricultural policies such as production subsidies
Weaknesses	**Threats**
Ineffective system due to lack of enforcement Creates uncertainty in the market as the policy implies active involvement of state marketing agency May be a disincentive to private sector development in maize marketing In periods of oversupply, price setting does not benefit consumers	Overproduction of maize leads to ineffectiveness of policy

Source: Author's views.

farmers below the government announced price. Except for some markets in northern and central regions, the consumer prices have been below the ADMARC selling price at least up to mid-2007.

Table 10.5 presents a SWOT analysis of the current maize pricing policy. The main weakness of the price intervention is that such interventions are not effective since they are observed by ADMARC which in recent times has played very little role in the marketing of agricultural produce. It has the potential to protect the income of maize farmers and to encourage the commercialization of maize. However, for such pricing interventions to achieve this objective, massive budgetary resources have to be allocated to ADMARC in order that it can increase its role of buying maize from smallholder farmers. One weakness with the current pricing system is that it offers arbitrage opportunities for small-scale traders at the expense of smallholder returns from maize farming. ADMARC opens its markets late while private traders buy early at a lower price, and can sell the maize at a higher price to ADMARC when it opens its markets.

Domestic maize marketing interventions

As a result of liberalization, many players have emerged in the marketing of maize including large agro-processing manufacturing companies,

Table 10.6 Maize production and maize trade, 1990–2005 (thousands of tonnes)

Year	Maize production	ADMARC purchases	ADMARC maize sales	Maize exports	Maize imports
1990	1,342.81	200.63	340.17	0.31	372.81
1991	1,589.38	602.80	216.24	0.37	204.27
1992	657.00	44.21	308.69	0.15	186.55
1993	2,033.96	484.71	50.94	0.45	129.51
1994	1,040.00	49.99	263.53	2.10	419.61
1995	1,661.46	87.07	230.76	1.93	256.81
1996	1,793.46	62.93	150.62	1.36	53.43
1997	1,226.48	13.80	131.55	0.64	32.78
1998	1,772.39	53.52	563.18	0.62	243.26
1999	2,479.41	198.05	175.08	1.67	144.67
2000	2,501.31	9.04	80.47	12.41	5.30
2001	1,589.44	0.13	51.44	22.04	45.44
2002	1,556.98	4.12	–	1.36	292.43
2003	1,983.44	35.80	–	31.64	37.33
2004	1,733.13	9.85	–	10.98	95.70
2005	1,253.00	91.10	–	17.15	165.72

Sources: Reserve Bank of Malawi (2002), *Financial and Economic Review*, **34** (2) and FAOSTAT data.

large-scale agricultural produce trading companies and small-scale private traders (Mvula et al., 2003). The role of the state marketing agency has been diluted and ADMARC is no longer a major buyer of agricultural produce (Table 10.6). Although ADMARC has its marketing infrastructure in remote parts of the country, most of these are not being used, such that it is no longer a credible constraint to private sector operations. Since 2001, ADMARC has been experiencing financial difficulties, exacerbated by government reduction of funding to commercial parastatals. As a result, ADMARC has hardly bought any maize or other produce from smallholder farmers in recent times. ADMARC maize purchases have declined from 602,800 tonnes in 1991 to 129 tonnes in 2001. Similarly, ADMARC sales declined from 340,170 tonnes in 1990 to 51,440 tonnes in 2001. In the post-1994 period, ADMARC purchases of maize from smallholder farmers have generally been lower than the sales, due to the fact that the maize that was being sold by ADMARC was provided by the National Food Reserve Agency. The volume of formal international trade in maize is relatively small compared with domestic production. Malawi rarely exports maize since in the past two decades production has been below the national requirements. This has necessitated sizeable imports to complement domestic supply. Chirwa and Ngalawa (2006) also note that most of the import surges have been necessitated by unfavourable weather conditions and failure to produce adequate maize to meet domestic consumption.

There has been considerable debate on the role of ADMARC in the marketing of agricultural inputs and agricultural produce. In 2002, the privatization of ADMARC was seen as one of the strategies towards complete liberalization of agricultural markets and in the development of the agricultural sector (GoM, 2002). The case for privatization of ADMARC is supported by studies conducted by Abbott and Poulin (1996) and M&O Associates (2001). By contrast, the GoM (2002) finds that a lack of agricultural markets due to the withdrawal of ADMARC or reduction in its marketing activities has been associated with declining smallholder welfare.

In any case, the private sector has flourished over time and most of the agricultural trade is being handled by small-scale private traders. However, other studies suggest that the private marketing system may not be efficient, and markets for agricultural output and produce remain imperfect. Mvula et al. (2003) find that some of the private traders in rural Malawi behave as discriminating monopsonists or monopolists, typical of undeveloped agricultural markets in developing countries. The inefficiency of the private marketing system is also manifested in the weak integration of spatial markets in Malawi, although Chirwa and Zakeyo (2003) note that market integration is higher in farm produce in which price liberalization was complete compared to maize in which the state continues to intervene.

Although the activities of ADMARC are not a major barrier to private sector activities in the marketing of maize, the uncertainty over ADMARC's mandate and potential policy reversals do pose challenges for private sector development. In 2004, the government passed a bill in parliament commercializing ADMARC, splitting it into a commercial and non-commercial entity, but the *modus operandi* has not changed. More recently, the government has announced its intention to restore ADMARC to the role it used to play prior to liberalization. According to GoM (2006, p. 20): 'instead of the commercialization of ADMARC as earlier envisaged it is planned to reform ADMARC so that it functions as it did in the pre-1972 days when it was essentially engaged in the purchasing of smallholder crops, principally maize, and other grains and selling farm inputs such as fertilizer and farm implements'. This however, has not been implemented, and the government has not provided the necessary resources.

Table 10.7 presents a SWOT analysis of the maize marketing intervention. The main strength of state intervention, given the poor infrastructure,

Table 10.7 SWOT analysis of the maize marketing policy

Strengths	Opportunities
Offers markets to smallholder farmers in remote areas Extensive state marketing infrastructure facilitate the distribution of maize in food crises Maize can be locally stored in district or regional markets for sale in the lean period Good business practices – limited cheating on measurements Moderates private sector rent-seeking behaviour	Policy coordination with other agricultural policies such as production subsidies Integration of markets especially in food crisis periods
Weaknesses	**Threats**
Marketing activities are highly dependent on government budgetary allocation Late opening of ADMARC markets leading to distress sales of maize to private traders by smallholder farmers	Lack of liquidity and mismanagement Restructuring of ADMARC into commercial and social functions, with social functions at risk of being ignored Weak commercial incentives and government interference in the operations of ADMARC

Source: Author's views.

is the fact that it offers a market for smallholder farmers especially in remote areas. In most rural areas, due to problems of road infrastructure, private maize marketing is not competitive and tends to be dominated by local monopsonists who often exploit smallholder farmers. In addition, ADMARC's marketing activities tend to moderate private sector rent-seeking behaviour. Mvula et al. (2003) find that private traders tend to offer lower prices to maize producers early in the marketing season before ADMARC opens its markets, but prices improve when ADMARC starts to buy maize from smallholder farmers. However, the major weaknesses of state marketing activities are the dependence on the government budget and the late opening of markets due to lack of liquidity.

International trade restrictions

Periodic export bans have sent mixed signals to the private sector; the unpredictability of government policy has not facilitated trade in grains

Table 10.8 Annual formal and informal maize trade, 2004–2007 (mt)

Year	Formal maize exports	Informal maize exports	Formal maize imports	Informal maize imports
2004	10,980	687	95,700	76,206
2005	17,150	1,205	165,720	165,451
2006	–	3,766	–	79,525

Sources: FEWSNET and FAOSTAT data.

within trading blocs such as COMESA and SADC, since due to food security concerns, Malawi is failing to adhere to the COMESA principle of maize without borders.

The recent export ban with respect to the 2005/06 above-average harvest, largely supported by the input subsidy programme, has had some adverse effects on the maize trade. The price of maize collapsed and, as observed above, the domestic consumer price fell from MK 47 per kilogram in March 2006 to MK 19 per kilogram in May 2006.

Import restrictions have been justified on the basis of fear of depressing maize prices, thereby creating disincentives to domestic maize farmers. Such export bans and import licensing have largely affected the formal sector, while informal trade has thrived under such conditions. It is evident that there are a lot of informal imports that come from Mozambique. However, the impact of subsidization of fertilizer prices in 2005/06 substantially reduced informal imports.

Table 10.8 compares the formal and informal maize trade using annual series. Data on informal trade are only available from 2004. The data show that formal exports of maize are much higher than informal exports. With the bumper harvest in 2007, the government has allowed more formal exports. The lifting of the export ban is likely to promote informal trade through cross-border trade.

5 POLICY CHALLENGES FOR THE MAIZE SECTOR

Maize as a subsistence crop faces challenges from production to marketing. Market development is supported by surplus production potential, but with declining soil fertility, achieving maize productivity growth depends on the intensification of inputs and adoption of modern farming techniques. The major challenges are how to implement policies that stimulate maize production supported by consistent maize marketing policies.

Maize Production

Smallholder farmers, who are the main producers of maize, face several constraints that affect maize production. First, there is poor access to agricultural inputs such as fertilizer and seeds outside the Agricultural Input Subsidy Programme. This results in low productivity, primarily due to the cash constraints due to poorly functioning markets for farm credit. Most of the farmers are poor and cannot afford the price of fertilizers, particularly for use in production of own food. There is overwhelming evidence that the Agricultural Inputs Support Programme has raised smallholder farmers' access to inputs at affordable prices, which has positively influenced production outcomes. Other constraints with respect to access to inputs include occasional shortages of hybrid seed, distance to supply points and timeliness of supply.

Second, land degradation and land fragmentation poses another challenge in maize production. Land continues to be heavily degraded due to soil erosion, siltation of watercourses, water pollution, land fragmentation, decreasing landholding size, deforestation but above all declining soil fertility. Due to increasing population, land under customary tenure has been subdivided over generations and has become more fragmented. It is estimated that the average land-holding for smallholder farmers is less that 0.7 hectares compared to more than 1 hectare per household some three or four decades ago. Yet a large part of estate land is being underutilized or offered for sale. This offers huge opportunities for the government to broaden the land reform programme that is currently targeting only four districts in southern Malawi.

Third, there is overdependence on rain-fed agriculture. Although irrigation development has been touted as a way of improving the stability and productivity of maize production, very little has actually been accomplished. Land under irrigation cultivation is still under 1 per cent of cultivatable land. Most of the smallholder farmers have limited capital to invest in irrigation farming, and the irrigation that is taking place is supported by donor-funded projects.

Finally, the predominance of subsistence farmers with limited marketing skills means that maize is not seen as a commercial crop but primarily as a staple crop. This results in limited trade potential as there is limited demand and purchasing power. Consequently, production in the smallholder subsector is not primarily determined by output prices, as most maize is for consumption rather than for sale. A long period of subsidization of fertilizers and improved seeds that entails low stable prices would enable current subsistence maize farmers to switch to cash crops to generate income to purchase maize. This in the long term will lead to higher commercialization of maize. The current cost of subsidizing fertilizers and improved seeds is about 43 per cent of the agricultural budget or 5 per cent of the fiscal budget. However, as more subsistence farmers switch into other high value-cash crops, there may be scope for scaling down the subsidy.

Maize Marketing

Most of the maize that is produced in Malawi is consumed by farmers. It is estimated that only 15 per cent of maize produced is marketed to other maize consumers. There are several issues that pose challenges to increased domestic and international trade. First, the markets for agricultural products are far from perfect even for main cash crops. The maize market is dominated by small-scale traders who operate within a small geographic area. These traders buy in small units, have limited storage facilities, and immediately look for selling opportunities. They lack access to finance (working capital).

Second, the infrastructure to facilitate efficient marketing services is wanting in most parts of the country. Most of the private traders tend to operate in areas where the road infrastructure is good throughout the year.

Third, decisions on lifting the export ban are dependent on crop production estimates released in April/May. Thus, although the price movements after the 2006 harvest revealed that there was an excess supply of maize, the export ban was maintained until the next harvest, and prices have continued to decline despite the lifting of the ban. The private traders also had a lot of maize that they could not sell in the domestic market, and could not export because the government had not yet lifted the export ban. Export bans therefore add to the cost of storing maize for both the private sector and state marketing institutions.

The main challenge in the marketing of maize is to ensure that the markets operate efficiently. It has also been noted that the private marketing system is not well developed, and small-scale maize traders face several constraints that have implications for efficiency. Alternative policies that may address these constraints include facilitating the development of markets through better infrastructure, liberal export policies through better forecasting of maize balances and selective government intervention in marketing such as:

- *Promoting private sector trade* Policies that create a supportive environment for private operations can improve the performance of the private marketing system. Such a supportive environment should include the development of road infrastructure, better communication facilities, and improved access to credit by the small-scale traders. One of the constraints that the small-scale traders face is lack of finance to support their working capital needs and investment in storage facilities. Malawi also needs massive investments in road infrastructure in order to facilitate private sector trade in maize marketing.

- *Selective state marketing activities* State marketing activities are still important, although critical reforms are required to minimize the extent to which they may hold back private sector development. The current state of infrastructure necessitates the need for state intervention in the marketing of agricultural products. State marketing activities favour smallholder farmers in remote areas where the private maize market system is not efficient, but are potentially an impediment to private trade in markets with good infrastructure. Nonetheless, state marketing activities may be costly to the government through the subsidization of non-profitable activities. While ADMARC operates in areas where the private market system is working well such as urban areas, a better policy option is to rationalize the mandate and activities of ADMARC such that it does not hinder the operations of the private sector where private competition exists. One policy option is to focus the ADMARC's mandate so that it operates only in rural markets where the private marketing system is weak and allows it to be flexible in the purchase and selling prices of agricultural produce.
- *Liberal international trade policies* The implementation of the agricultural input subsidy that is resulting in bumper maize harvests should be supported with a liberal maize export policy. The timing of the lifting of export bans can be improved with better forecasting of production and available maize stocks in the country. This can be achieved through collaboration and building trust between the private sector grain traders and government. Such a liberal export policy may also help the government in the stabilization of maize prices through import and export policies. This may be a more effective instrument of stabilizing prices compared to the price ceilings that are enforced only by the state marketing agency.

Policy Coherence

There are also general policy challenges, particularly the ability to formulate policies that are compatible with agricultural objectives. The policies that are compatible with increasing productivity in food staples include the input subsidy policy and domestic market liberalization. The appropriate use of improved seeds and fertilizers is likely to raise maize productivity per unit of land. Domestic market liberalization can potentially offer incentives for farmers, especially if competition leads to better prices for staples.

Second, policy actions that would promote the achievement of adequate national food supplies include the input subsidy policy, the price support system, state marketing activities and zero tariffs on maize imports. A well-managed price support system reduces uncertainty in farmers' planning decisions while at the same time ensuring a stable price for net maize buyers.

The import restrictions are not compatible with improving access to maize and are therefore counter to the national food security objectives. The export bans have different implications for the stakeholders in the maize market chain. For food-insecure or net maize buyers, export bans ensure access to cheaper locally available maize relative to imported maize. This also saves the government from engaging in expensive importation of maize in the lean season. The export bans create uncertainties and are an impediment to international trade among the private traders and those smallholder farmers that are net maize sellers. However, Malawi has had several bad experiences of completely opening up maize export trade, leading to both severe shortages and very costly imports. The availability of maize in Malawi is a highly political issue with free exports of maize that lead to shortages in the domestic supply being taken as a deliberate government policy to starve its population.

There is a need to align trade policies to domestic maize production policies in order to achieve the dual objectives of ensuring food security and improving maize productivity. The following trade policies may be compatible with stated policy objectives:

- *Maize import policy* The import licensing requirement for maize should be phased out. This is likely to have a positive effect on food security by augmenting domestic supply. First, free importation will allow stakeholders, particularly the private sector, to respond quickly to food shortages. Second, imports can introduce competition which may benefit domestic farmers by providing incentives to adopt more productivity-enhancing farming methods.
- *Maize export policy* Since maize is still treated as a sensitive product, its export should continue to be regulated. However, export bans should be eliminated in favour of a liberal export licensing system with improved consultation between the private and public sectors. Improved cooperation between the government and private

traders based on mutual trust, can improve the exchange of information that may allow a more flexible export regime for maize.

6 CONCLUSIONS AND RECOMMENDATIONS

The review of maize trade policy reveals mixed effectiveness of current policies in achieving stated and perceived objectives in agricultural development. Several objectives and policies are being pursued by the government that often conflict with other objectives. This results in policy incoherence. Since the implementation of the agricultural input subsidy, Malawi has witnessed large increases in maize production, falling domestic maize prices and potential increases in the real income of smallholder farmers. However, the subsidy programme has not been supported with consistent maize marketing and trade policies such as the maintenance of price bands and the lifting of the export ban.

A more liberal policy of international trade in maize compatible with maize subsidization is required. Such a policy can also be used to stabilize the price. Duty-free imports would lower the cost of grain in times of production shortfalls and liberal export licensing could be used to stabilize prices in times of domestic surpluses. This is likely to contribute to the objective of commercialization of maize in the long term. Import restrictions in a country that experiences maize shortages weaken the response of the private sector to meet the demand. There is also evidence that in the past five years, the domestic price of maize has been much lower than the import price and this trend is to continue with the implementation of the input subsidy programme. It can therefore be argued that import licences for maize are a costly and needless burden which serves none of the sector objectives. With respect to export policy, export bans should be replaced by a liberal export licensing policy that would require better forecasting of domestic production, stocks and collaboration between the private sector and the government.

The implementation of such policies requires that the policy-making process is evidence based, in order to determine the extent of export licensing. Most of the export bans that Malawi imposes are not based on economic analysis. The lack of evidence-based policy making is historical and partly explained by lack of technical skills in trade policy-making institutions. The MTPSD (2004) observe that despite a more consultative process between the government and the private sector through national working groups, the government lacks the analytical resources to synthesize trade policies and their impact on various sectors of the economy and livelihood groups.

There is also a problem of roles and responsibilities among key ministries with respect to agricultural trade. There are four ministries with different interests in the maize trade: the Ministry of Trade and Private Sector Development (responsible for trade policy implementation); the Ministry of Economic Planning and Development (responsible for setting a good policy environment to facilitate investment); the Ministry of Finance (with a major interest in revenues and a need to avoid government maize imports); and the Ministry of Agriculture and Food Security (with an emphasis on ensuring food security). Although trade policy is expected to be implemented by the Ministry of Trade, it is formulated and implemented by the Ministry of Agriculture, yet the Ministry of Trade is expected to monitor trade performance. Import and export licences for maize are issued by the Ministry of Agriculture and Food Security. The sidelining of the Ministry of Trade in maize trade policies has resulted in policies that are incompatible with regional and multilateral trade agreements.

Nonetheless, the Ministry of Trade as a trade policy formulation, implementation and monitoring institution is highly resource constrained. Although the Ministry of Trade and Private Sector Development is central to trade policy analysis, formulation and implementation, it lacks resources to carry out its functions and is viewed as a marginal arm of government. Very few of its economists have the requisite training in trade issues, and it is therefore not able to monitor the performance of trade policies. The policy-making framework that was used under structural adjustment programmes has also weakened the importance of the Ministry of Trade on trade policy matters. Prior to those programmes, the Ministry of Trade and Private Sector Development took a leading role in the formulation of trade policies. However, multilateral institutions tended to negotiate with the Ministry of Finance, the Ministry of Economic Planning and Development and the Reserve Bank which rarely consulted other ministries in the processes of negotiating structural adjustment programmes.

It can therefore be argued that a coherent maize trade policy that supports direct interventions in maize production, requires better information, analytical skills and capacity building in the Ministry of Trade and Private Sector Development. It is also important to change the framework for policy formulation so that emphasis is placed on evidence-based policy making with donors providing support through capacity building of policy makers and professionals within the trade-implementing ministry. This also requires changing the mindset of policy makers so as to create an environment that demonstrates that the inputs of technical staff are valued in the policy-making process. In addition, policy makers should demand evidence-based analysis from technical experts for their policy formulation.

NOTES

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2. World Bank (2003) notes that the estimates for root crops (cassava and sweet potatoes) tend to be overstated and the potential food shortages understated.
3. Even when the ban is pronounced lifted, exports are subject to export licensing, and the authorities never grant export licences to exporters – effectively imposing an export ban.
4. The export of maize in 2001 by the National Food Reserve Agency (NFRA) before information on the 2001 harvest became available created immense political problems for the government, contributing to the food crisis in the 2001/02 season, leading to massive humanitarian operations (IMF, 2002).

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11. Alternative staple food trade and market policy interventions: country-level assessment of South Africa

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1 INTRODUCTION: NATIONAL TRADE AND MARKET POLICY OBJECTIVES

Agricultural Policy Objectives

Agriculture remains an important sector in South Africa despite its small direct share of the country's gross domestic product (GDP). In 2004 primary agriculture contributed 3 per cent to total GDP, while accounting for over 10 per cent of all reported employment (OECD, 2006). Between 2000 and 2003 the grain industry contributed approximately 16 per cent to the total gross value of agricultural production (SAGIS, 2005). It comprises all grain and oilseed industries, of which, maize and wheat are considered primary staple commodities.

The South African national development goal has two long-term objectives: reduce poverty and unemployment by 50 per cent by the year 2014; and create an inclusive economy through black economic empowerment (BEE) (Mlambo-Ngcuka, 2006). To achieve these objectives the government instituted the Accelerated and Shared Growth Initiative of South Africa (ASGISA). Under this initiative each sector within the economy is responsible for developing a plan to achieve the national development goal. The 'Strategic Plan for the South African Grain Industry' (SAGIS, 2005) outlines the grain industry's goals for establishing a globally competitive and profitable grain sector while allowing for equitable market access and participation.

Over the past two decades, both domestic and trade policy interventions within the maize industry have occurred within the context of vast political and socioeconomic change. The goal of government during this period was to create a food-secure, open and market-orientated economy while redressing the injustices of the past. The resultant set of policy interventions affecting the grain sector have successfully managed to achieve these goals. However, despite an extensive reform process the status quo within the industry is not able to catalyse the sector towards achieving a new level of competitiveness and profitability. In particular, there remain very few intervention and support mechanisms which can be utilized to support the informal and newly emerging commercial segment of the staple grain industries (Sandrey and Vink, 2006).

The primary objective of this case study is to assess the performance of the current trade and domestic policy set affecting the maize grain industry, in particular, the degree to which current approaches achieve the stated objective of a globally profitable and competitive maize grain sector and to identify possible constraints inhibiting the achievement of that objective.

Domestic and Trade Policy Review

Table 11.1 contains a chronological inventory of key policy decisions that affect the maize industries within South Africa from 1913 to the present.

Domestic policy reforms

Market reform Before 1996, the Marketing of Agriculture Product Act 59 of 1968 largely determined agricultural marketing policy. For the maize industry, a single-channel fixed-price scheme was established using a cost-plus approach to commodity pricing and margin determinations.

By the mid-1980s, internal pressure from domestic producers coupled with macro factors and international liberalization trends, led to a series of laws that reduced the role of government and increased reliance on market forces and the private sector.

The Marketing of Agricultural Products Act 47 of 1996 currently shapes agricultural marketing policy in South Africa. Under this Act, the Maize Board was abolished in 1997, leaving prices to be based on negotiation between market actors. The Agricultural Markets Division of the South African Futures Exchange (SAFEX) was established following deregulation. It is regarded as the 'benchmark' for the prices market actors ask or offer in the 'spot' market of daily trading in maize. SAFEX also reports fixed transport differentials to various destinations in the country; consequently, the spot price for a region is derived from the SAFEX price minus the transport differential.

Table 11.1 South Africa: chronology of maize marketing and trade policy decisions and implementation, 1913–2007

Year	Policy decisions
1913–40	Land Act of 1913 & 1936: established institutional framework of a dualistic agrarian structure
1940–80	Marketing Act of 1968: established Maize Marketing Board
	1970 Southern African Customs Union created
1980–90	White Paper on Agriculture of 1984: partial deregulation of agricultural sector
1991–92	Price controls on maize meal and millers' margins removed
	Tariff rate quotas replaced import/export licences and quotas for maize grain
	Maize farmers received a final direct subsidy
1994–95	White Paper on Agriculture of 1995
	Reconstruction and Development Programme (RDP)
	Broadening Access to Agriculture Thrust (BATAT)
	ANC Policy Document on Agriculture drafted
	Maize Board activities limited to buyer of last resort
	South Africa joins the Southern African Development Community (SADC)
	World Trade Organization (WTO): South Africa became a signatory
1995–96	Marketing of Agriculture Product Act 47 of 1996
	SAFEX Agricultural Markets Division's first commodity listed
	Water Act 36 of 1996
1996–97	Maize and Wheat Boards abolished
	SAFEX introduces trading derivatives (futures and options) for white and yellow maize
2000	Trade, Development and Cooperation Agreement (TDCA)
	SADC Trade Protocol implemented
	African Growth and Opportunity Act (AGOA)
2003	International Trade Administration Act of 2003 established
2004	Revised Southern African Customs Union

Sources: Robert et al. (1994); van Dijck and Otto (1995); van Rooyen et al. (1997); Thirtle et al. (2000); Draper (2003); Bertelsman-Scott and Draper (2004); Stern and Netshitomboni (2004); SAGIS (2005); Kirsten et al. (2006).

Budgetary expenditure reform One method of complying with the goal of a market-orientated agricultural sector was to reduce government fiscal support. This was achieved by removing direct government subsidies to the sector and reducing the budgetary allocation to the National Department of Agriculture (NDA), research and development, and tax concession available to commercial producers. In 1998, the budget allowance to

Table 11.2 Average agricultural subsidies, 1950–2000 (R millions)

Commodity	Description	1950s	1960s	1970s	1980s	1990s
Maize	Stabilization of maize price	44.3	140.7	462.1	1443.9	692.5
	Rail rates: maize and maize products	2.3	37.4	28.3		
	Handling/storage of maize	0.008	0.008	0	0	0
	Duty on imported maize	0.5	0	0	0	0

Source: Kirsten et al. (2006).

the NDA was 54 per cent less in real terms than 1988. Funds devoted to research and development dropped from R335 million in 1997/98 to R262 million in 2001/02; and the asset depreciation tax concession period increased from 1 to 3 years (Kirsten et al., 2006). Table 11.2 lists the direct agricultural subsidies paid out to the maize subsectors. In the 1991/92 production season maize farmers received a final direct subsidy in the form of a drought relief payment.

Trade policy reforms

Several trade reforms were enacted to meet the objective of establishing a market-orientated economy and to comply with requirements of various trade agreements. These include the reduction of tariff levels; the establishment of sanitary and photosanitary (SPS) standards; and the replacement of quantitative restrictions, import and export permits and specific duties with tariffs. To implement these trade reforms, key institutions were established or restructured. These include:

1. *International Trade Administration Commission (ITAC)* Established under the International Trade Administration Act of 2003, ITAC replaced the Board of Tariffs and Trade (BTT) as the tariff body for the South African Customs Union (SACU).
2. *Food Safety and Quality Assurance (FSQA) Directorate* Responsibilities include standardizing quality norms for grains and grain products for both domestic and export markets and regulating and administering chemicals used within the grain sector.
3. *South African Agricultural Food, Quarantine and Inspection Services Directorate* Responsible for enforcing the application and adherence to the quality standards set by the FSQA Directorate within the domestic market.
4. *Perishable Products Export Control Board (PPECB)* Responsible for the inspection of grains intended for export and the enforcement

Table 11.3 Current tariff position for maize and maize products

Tariff heading	Subheading	Article description	Rates of duty		
			General	EU	SADC
10.05		Maize (corn):			
	1005.10	Seed	Free	Free	Free
	1005.90	Other	Free	Free	Free
11.02		Cereal flours (excluding wheat or meslin)			
	1102.20	Maize (corn) flour	Free	Free	Free
11.03		Cereal groats, meal and pellets			
	1103.13	Of maize (corn)	5%	5%	Free
11.04		Cereal grains otherwise worked (hulled, rolled, flaked, pearled, sliced or kibbled, germ of cereals, whole, rolled flaked or ground)			
	1104.23	Of maize (corn)	5%	5%	Free

Source: ITAC (2007).

of standards regarding Food Hygiene and Food Safety of Regulated Agricultural Food Products of Plant Origin.

5. *NDA* Division of Plant Health and Quality establishes phytosanitary standards for the grain sector.
6. *Department of Health* Responsible for administrating, compiling and publishing legislation relating to food safety of grain products sold locally and/or imported into the country.

Trade reforms have reduced the number of tariff lines between 1990 and 1999, from 12,500 in 200 tariff bands to 7,743 in 47 tariff bands as well as an economy-wide reduction in overall tariff levels from 28 to 7.1 per cent (Kirsten et al., 2006). In the maize subsector, all non-tariff measures applied were abolished in favour of tariff protection using a tariff band formula which delivers a tariff only if world prices fall below a reference price of US$110/ton based on fob US Gulf ports (ITAC, 2007). Table 11.3 summarizes the existing tariff subheading and rate of duty for maize and maize products.

Multilateral and bilateral trade agreements South Africa's domestic and trade policy interventions affecting stakeholders along the maize supply chain are compatible since they enable South Africa to meet its international trade agreement obligations. For example, the enforcement of the Marketing of Agricultural Products Act, No. 47, of 1997 removed price controls along the maize supply chains; abolished export subsidies;

and replaced import and export licences and quotas for maize and wheat grains with a system of tariff rate quotas. These reform measures are consistent with allowances available to the grain sector under the World Trade Organization's Agreement on Agriculture (AoA).

Due to the implementation of its various reform objectives, South Africa has been able to successfully negotiate favourable bilateral and multilateral trade agreements. These include:

1. *World Trade Organization (WTO)* In 1994, South Africa became party to all WTO agreements.
2. *African Growth and Opportunity Act (AGOA)* Promulgated in 2000, allows for generalized system of preferences status for certain South African products by providing duty-free access into the US market.
3. *The Trade, Development and Cooperation Agreement (TDCA)* Promulgated in 2000. Provisions include preferential access to South African markets for all EU member states with reciprocal concessions.
4. *The Southern African Development Community (SADC) Trade Protocol* Entered in 1996, implemented in 2000. Provides preferential access to South Africa's markets for all SADC member countries with reciprocal concessions.
5. *The revised SACU treaty enacted in July 2004* ITAC sets the tariff levels and the anti-dumping legislation while national bodies, within each member country, are responsible for the administration of tariff remedies.

A strong indicator of the extent of the reform policies' impact on the agricultural sector is a declining level of the producer support estimate (PSE) since 1994. The Organization for Economic Cooperation and Development (OECD) estimates that between 2000 and 2003, South Africa's PSE was approximately 5 per cent, compared to the 31 per cent average for OECD countries (OECD, 2006). In term of maize, between 2000 and 2003, the PSE was 7.6 per cent (OECD, 2006). This indicates a relatively moderate degree of policy interventions at the producer level within the sector.

Public investment

To determine the amount of public investment aimed at achieving the national agricultural policy objectives, a brief discussion on the NDA expenditure pattern follows. Table 11.4 summarizes the expenditure patterns between 2003/04 and 2006/07. Expenditure is divided into two categories, operating costs and programmes. Operating costs include payments

Table 11.4 NDA expenditure pattern (R thousands)

	2003/04		2004/05		2005/06		2006/07	
	Actual	% of total	Actual	% of total	Actual	% of total	Actual	% of total
Operating costs								
Compensation of employees	273,086	22.9	320,093	22.7	257,132	14.2	462,820	19.9
Goods & services	258,247	21.6	260,709	18.5	358,110	19.8	439,094	18.9
Payment for capital assets	29,305	2.5	64,630	4.6	56,564	3.1	52,503	2.3
Programs								
Administration	273	0.02	863	0.06	1,475	0.1	1,239	0.1
Livelihood, economics & business development	12,324	1.0	215,298	15.3	550,644	30.5	582,597	25.0
Bio-security & disaster management	259,628	21.7	139,803	9.9	154,244	8.5	214,959	9.2
Production & resource management	36,608	3.1	45,194	3.2	43,469	2.4	59,417	2.6
Sector services & partnerships	324,380	27.2	360,663	25.6	384,474	21.3	515,001	22.1
Annual total	1,193,851		1,407,253		1,806,112		2,327,630	

Source: National Department of Agriculture, www.agric.za, accessed July–August 2007.

made to wages and salaries, goods and services, and capital assets. These costs, between the 2003/04 and 2006/07 marketing years, ranged anywhere from 37 to 47 per cent of the total budget. The programmes category of expenditure consists of five programmes aimed at achieving increased market access for emerging small-scale producers, increased profitability of the sector, and poverty reduction:

1. *Administration* Provides the NDA with political leadership, capital and infrastructure management services.
2. *Livelihood, economics and business development* Promotes broad-based BEE within the agriculture sector by providing post-settlement support, facilitating international and domestic market access for emerging farmers, and evaluating economic performance of the sector.
3. *Bio-security and disaster management* Ensures food safety and risk management for animal diseases and plant pests through early warnings and post-disaster support.
4. *Production and resource management* Supports agricultural research and development and transfer.
5. *Sector services and partnerships* Provides services such as research, extension, and advisory of intergovernmental, stakeholder and international relations.

Only the first two programmes received increasing percentage shares of total departmental expenditures between 2003/04 and 2006/07. In terms of the second programme, the main driver behind the increase between 2003/04 and 2004/05 was the implementation of the Comprehensive Agricultural Support Programme (CASP). The increase in the following marketing year was largely due to a R140 million allocation to the World Food Programme, and R150 million for the inception of the Micro-Agricultural Financial Institutions of South Africa (MAFISA) which provides micro financing to rural households, small farmers and emerging agribusinesses.

2 PERFORMANCE OF THE CURRENT TRADE AND DOMESTIC POLICY SET

Overview of the Grain Subsector

The maize supply chain comprises six distinct activities: production, storage, trading, processing, retailing and consumption. Although the movement of grain from the farm level through to the consumption level can be classified into six distinct activities, it is not simple identifying the key market participants involved within each activity. Many of the firms involved in the market are vertically integrated with either their upstream or downstream markets (Traub and Jayne, 2005).

Producers

South African grain production comprises both commercial and subsistent producers. In 2005, there were approximately 18,000 commercial grain producers, who accounted for 90 per cent of all grains produced, while approximately 3 million subsistence farmers accounted for the remaining 10 per cent (SAGIS, 2005). Of the 18,000 commercial grain producers, approximately 9,000 were maize farmers (Business Day, 2005).

Storage industry

Due to the restrictive policies on the movement of grain within the country and pan-territorial pricing, cooperatives or storage silos arose within a pre-set radius. These silos, under special licensing agreements with their grain board, were given the right to collect and store grain (Essinger et al., 1998). Following reform and the conversion of cooperatives to joint-equity companies, the former cooperatives remain closely tied to grain farmers within their operating areas through the provision of farming equipment, insurance and financing. Currently there is approximately 17 million tonnes of bulk storage capacity within the country, 70 per cent of which is owned by three companies (Food Price Monitoring Committee, 2003).

Traders

The trading/brokering market is dominated by two multinational companies, Cargill and Louis Dreyfus. Cargill is involved in trading for the domestic market whereas Dreyfus is focused on the import–export markets (le Clus, 2004). It has been estimated that as much as two-thirds of the 70 per cent of maize grain that passes through to the large domestic millers is traded by Cargill and Dreyfus (ibid.). The remaining firms involved in the market can be divided into three groups: independent, bank- and silo-associated traders.

Processors

The processors along the maize supply chain include the milling and the animal feed industries. There are at least 190 companies involved in maize milling. Twenty-two of these are responsible for generating 85 per cent of all maize milled within the country, with the top four companies accounting for 73 per cent of total market share (de Villers and Moloitsane, 2003; NDA, 2006).

Retailers

Within South Africa, food distribution channels do not follow a traditional pattern of manufacture-to-wholesaler, wholesaler-to-retailer structure. Many of the larger retailers have internalized the role of wholesalers by creating their own distribution network (Achterberg and Hartzenberg, 2002). Over the years, due to mergers and acquisitions, the wholesale/retail sector has become highly concentrated which has led to the wholesale/retail sector having considerable bargaining power when negotiating buying terms with suppliers.

In terms of staple food retailing, national chains such as Woolworth, Pick 'n Pay, Shoprite Checkers and Spar service medium- to higher-income consumers in both the urban and peri-urban areas, whereas regional retail outlets and neighbourhood 'spazas' service low-income consumers in rural, urban and peri-urban areas.

Consumers

In general, the 'typical' maize meal consumer refers to a low-income individual residing in urban and rural areas. However, it is important to note that per capita consumption of maize meal has been decreasing over the past two years while average annual expenditure on wheat products has been increasing (BFAP, 2006).

Given the extensive reform process, the structural change to the maize market impacted on the market participants in a variety of ways. Table 11.5 lists the trade and domestic policies most likely to influence the decision-making process of the key stakeholders along the supply chain and briefly summarizes the implications. The degree to which current policy approaches to the maize grain sector is achieving or has achieved the stated agricultural policy objectives is assessed using a SWOT (strength, weakness, opportunities and threats) framework.

Strengths and Weaknesses

In assessing the strengths and weakness of the current set of domestic and trade policy interventions affecting the maize grain sector, domestic excess food needs, monthly trends in domestic prices, and measures of price variability are examined.

Domestic consumption patterns

Domestic producers of maize are able to meet local demand requirements for human and animal feed consumption in most production years. Table 11.6 summarizes the domestic production, consumption and excess food needs in terms of maize, between 1990 and 2006. Although yellow maize is predominantly used in the feed market, both white and yellow maize have

Table 11.5 Impact of domestic and trade policy reforms on maize supply chain stakeholders

Stakeholders	Relevant domestic and trade policy	Implications
Producers	Marketing of Agriculture Product Act of 1996, & White Paper on Agriculture 1984 and 1995	Removed subsidies to commercial maize grain farmers; removed pan-territorial and pan-seasonal pricing Changed cropping patterns – shifted from maize grain and into higher-value commodities, increased irrigated land use Producer given a variety of methods for selling grain: pool system, back-to-back options, outside purchase, and/or hedging through SAFEX
	Land Reform – LRAD & CASP Programmes	Restoring traditional lands seized under apartheid Improved technology in order to maintain/increase yields and decreased area planted to maize
	Labour Relations Act Basic Conditions of Employment Act	Applied labour laws to farm workers and established a minimum wage
	Skills Development Act Employment Equity Act	Decline in employment on the commercial farms, a switch from labour- to capital-intensive practices, and an increase demand for skilled workers
	Tariff Dispensation on Maize	Removed quantitative restrictions and specific duties with tariffs Producers exposed to international maize markets
Storage industry	Marketing of Agriculture Product Act of 1996 & White Paper on Agriculture 1984 and 1995	Removed price control, and Maize Board's control over storage cooperatives Former storage cooperatives converting into joint-equity companies
Traders	White Paper on Agriculture 1984 and 1995	Removed requirements on trader registration, and restrictions on grain movement

Table 11.5 (continued)

Stakeholders	Relevant domestic and trade policy	Implications
		Domestic and multinational grain trading companies entered the market
	Tariff Dispensation on Maize	0% tariff rate on maize grain seed
Processors	White Paper on Agriculture 1984 and 1995	Removed requirements on miller registration, restrictions on grain movement, and control on maize marketing margins
		Processors are faced with a variety of methods for procuring maize grain; most common is a forward contract
	Tariff Dispensation on Maize	5% tariff on maize meal and/or hulled, pearled, sliced or kibbled
Retailers	White Paper on Agriculture 1984 and 1995	Removed price control on maize meal
	Tariff Dispensation on Maize	5% tariff on maize meal and/or hulled, pearled, sliced or kibbled

Sources: Essinger et al. (1998); Kirsten et al. (2006).

been included in the calculation of total production, since in years of white maize shortage, yellow maize is used as an additive in the processing of maize meal for human consumption.

This table demonstrates that domestic maize producers exceed local food consumption requirements despite the transition from single-channel marketing to a free market system. One exception is in the 1992/93 marketing year, when domestic demand exceeded production due to a severe drought.

Average maize production has been increasing despite the declining trend in the acreage planted since the deregulation of the markets. This is largely due to the adoption of more suitable varieties and improved production practices. White maize production trends upwards while domestic consumption remains relatively constant, with a very slight upward trend until 2001, when a slight decline is observed. This implies an increasing

Table 11.6 Total annual maize domestic production and human consumption, 1990–2006 (1000 tonnes)

	Total maize production by province										Total human consumption	Domestic excess food needs
	WC	EC	NC	FS	KZN	MP	LP	GP	NW	Total		
1990/91	4	62	104	2,779	319	1,832	74	394	2,773	8,341	3,208	5,133
1991/92	3	62	110	2,121	340	2,074	107	435	2,573	7,825	980	6,845
1992/93	n.a.	34	125	850	237	1,092	49	163	404	2,954	3,421	−467
1993/94	5	65	157	3,316	295	2,254	69	450	2,466	9,077	3,237	5,840
1994/95	6	76	178	4,336	359	2,672	89	716	3,635	12,067	3,495	8,572
1995/96	20	90	160	1,257	266	1,135	30	281	1,167	4,406	3,318	1,088
1996/97	25	117	180	3,292	328	1,948	64	465	3,275	9,694	3,316	6,378
1997/98	22	40	168	3,020	300	1,535	58	345	3,000	8,488	3,255	5,233
1998/99	n.a.	34	173	2,494	264	1,460	48	364	2,240	7,077	3,457	3,620
1999/00	n.a.	30	180	2,631	222	1,684	47	329	1,585	6,708	3,473	3,235
2000/01	n.a.	44	253	3,863	264	2,177	124	419	2,990	10,133	3,858	6,275
2001/02	864	45	318	2,596	247	1,467	88	322	2,133	7,217	3,643	3,574
2002/03	15	45	511	3,217	403	2,068	107	484	2,885	9,732	3,687	6,045
2003/04	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3,766	n.a.
2004/05	15	82	511	3,100	390	2,219	115	483	2,568	9,482	3,747	5,735
2005/06	20	88	557	4,113	400	2,807	120	483	2,863	11,450	3,487	7,963

Note: n.a. information not available.
Province abbreviations: WC = Western Cape, EC = Eastern Cape, NC = Northern Cape, FS = Free State, KZN = Kwazulu Natal, MP = Mpumalanga, LP = Limpopo Province, GP = Gauteng, NW = Northwest Province.

Source: SAGIS.

ability of domestic producers to meet domestic consumption needs despite the transition from a controlled to a free market system.

Trade patterns

Surplus maize grain is exported mainly to BLNS countries (Botswana, Lesotho, Namibia and Swaziland), Zimbabwe, Kenya, Mozambique, Zambia and Mauritius and in some years, to Japan.

The top 10 destinations for South African maize grain accounted for 78.3 per cent of total maize grain exports in the pre-deregulation period, and 90.6 per cent in the post-deregulation period. Furthermore, within the reform period, approximately 72 per cent of total maize grain exports are traded with African countries compared to 2.7 per cent under the pre-reform period. The change in the make-up of export markets can be largely attributed to two factors: the removal of sanctions within the Southern African region, and South Africa's involvement in regional and continental agreements such as the New Economic Partnerships for African Development (NEPAD), African Union (AU), and SADC.

Extensive trade reforms have had a positive impact on the balance of trade in terms of maize grain and products. The maize sector generates a trade surplus in grain and products. Only in years of drought does a maize deficit occur (marketing years 1983/84, 1992/93, 1995/96 and 2006/07). Despite maintaining a trade surplus, net export volumes have been decreasing at an average rate of 60,035 metric tons a year throughout the observation period. When the period is divided into pre-reform (1979/80 to 1996/97) and post-reform (1996/97 to 2006/07) periods, the rates of decline in net exports vary significantly. In the pre-reform period, net exports decline on average by 99,809 tonnes per year, compared to 51,000 tonnes per year in the post-reform period, indicating that the rate of decline in net export volume has slowed following full market deregulation and trade policy reform. This reduction in the rate of decline can be largely attributed to two factors: improved technology and changing consumption patterns. The transition from a controlled marketing system to an increasingly free market one made it imperative that domestic producers adopt improved technology and farming practices. The practice of planting to marginal land stopped while there was a significant increase in the maize area planted under irrigation. In the 1980s the total area of maize planted was approximately 4 million hectares; it was less than 3 million hectares by the late 1990s. Despite the decline in area planted, production remained relatively constant (and even increased) while average maize production became relatively more stable. Given increased yields and a slight decline in human consumption of maize within recent years, the rate of decline in net exports of maize has slowed.

Monthly trends in price levels

Following the removal of price controls, producer[2] and wholesale[3] prices declined over the observation period, while retail[4] maize meal prices exhibit an upward trend. Figure 11.1 depicts the movement of CPI-deflated monthly average producer, wholesale and retail prices in the maize market between May 1976 and December 2007. The figure divides the sample period into three phases of marketing policy. Phase 1 represents the control period; Phase 2, the partial reform period; and Phase 3, the full reform period.

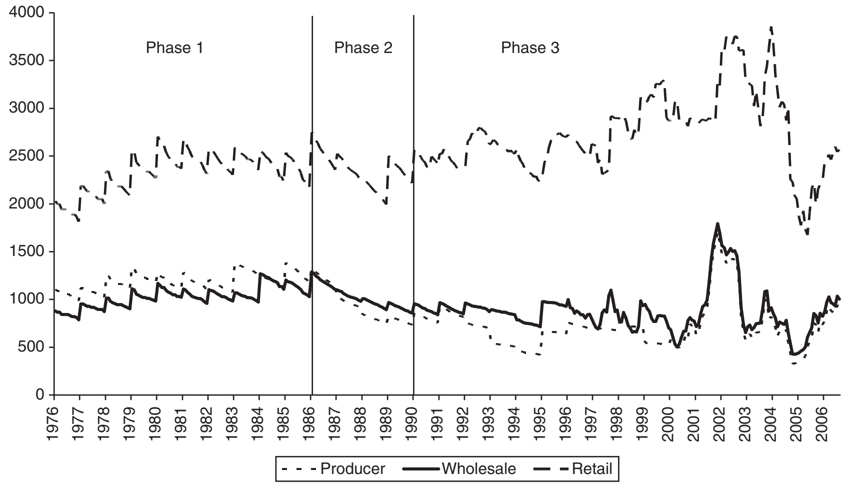
Under Phase 1, all price series trend upwards. When a linear trend line is fitted to each price, retail prices show a faster upward price trend of approximately R3.46/tonne per month compared to wholesale and producer maize grain prices; these exhibit an upward trend of approximately R2.36/tonne per month and R1.31/tonne per month, respectively. Regarding producer prices, one can see dramatic changes between Phase 1 and Phase 2. For most of Phase 1, producer prices were higher than wholesale prices, reflecting subsidization of the Maize Board's marketing costs. This ended in Phase 2 when producer prices were the residual after the Board deducted its costs from sales revenues.

Under partial and full market reform periods, producer and wholesale prices exhibit a slight downward trend, whereas retail maize meal prices continue to increase in real terms. The linear trend fitted to the retail price of maize meal exhibits a positive slope of R2.74/tonne per month, while wholesale and producer prices exhibit a trend decline of R0.4/tonne per month and R1.18/tonne per month, respectively. Figure 11.1 shows a substantial widening of the producer-to-retail and wholesale-to-retail price spreads within the maize industry, following market deregulation.

Price variability

To measure the level of price volatility facing different market participants within the maize industry, the standard deviation and coefficient of variation (COV) for producer, wholesale and retail prices were calculated. Table 11.7 summarizes the unconditional means, standard deviation and COV for maize prices during the three time periods of market policy. Phase 3 was further subdivided into two time periods; 5/1991–4/1994 representing the period of price control removal, and 5/1994–12/2006 during which South Africa became a signatory to the WTO (Uruguay Round) and the dismantling of the Maize Board.

Between Phases 1 and 2, average monthly producer prices declined by 30 per cent and became slightly more volatile, while wholesale maize grain prices declined by 9 per cent and became less volatile. During the same period, average monthly retail prices remained roughly constant and



Source: Traub and Jayne (2008).

Figure 11.1 Producer, wholesale and retail maize grain and meal prices, South Africa, May 1976 to December 2006 (constant 2000 rands)

became less volatile. In Phase 3, May 1991 to December 2006, the decontrolled average producer and wholesale prices declined even further in real terms while both become substantially more volatile. The coefficients of variation for producer prices increased from 9.8 to 35.2 as we move from Phase 2 to Phase 3, and 7.0 to 26.8 for wholesale prices. These increases in volatility indicate increasing price risk to both producers and grain traders. This is not surprising, since the grain industry underwent extensive structural adjustment between these periods. Market reforms included the removal of miller registration, price control on maize meal, and maize marketing margins, and the establishment of the Maize Board as the buyer of last resort. However, while price variability clearly increases between the two periods, it is not possible to use the data presented to determine precisely what portion of increased price variability may be attributed to government programme and policy changes. One would need to control for other factors such as production levels, seasonality and time trends.

Retail maize meal prices became more variable and have steadily risen. During the sample period (1994 to 2006), real maize meal prices were 20 per cent higher than before price deregulation in 1991, and were more than three times higher than the wholesale price of maize grain.

Despite the increased price volatility, private sector investment within

Table 11.7 Measures of maize grain and maize meal price variability in South Africa, May 1976 to December 2006

	Phase 1: control period	Phase 2: partial reform	Phase 3: full market deregulation		
	5/1976–4/1987 (n=132)	5/1987–4/1991 (n=48)	5/1991–4/1994 (n=36)	5/1994–12/2006 (n=152)	5/1991–12/2006 (n=188)
Producer price, maize grain (R/mt)*					
Mean	1,188	836	706	724	720
Standard deviation	91	82	145	273	535
Coefficient of variation (%)	7.7	9.8	20.5	37.8	35.2
Wholesale price, maize grain (R/mt)					
Mean	1,039	950	898	869	874
Standard deviation	113	66	36	259	234
Coefficient of variation (%)	10.9	7.0	4.1	29.9	26.8
Retail price, maize meal (R/mt)					
Mean	2,351	2,336	2,581	2,794	2,753
Standard deviation	207	149	127	458	423
Coefficient of variation (%)	8.8	6.4	4.9	16.4	15.4

Note: * Producer prices from 2000 onwards are estimated as the SAFEX/Randfontein monthly spot price minus the median transport cost from various production points to Randfontein minus an additional R43/mt representing commissions and storage charges.

Source: Traub and Jayne (2008).

the grain sector expanded after market reform. Industry experts point to increased export opportunities and the introduction of innovated marketing processes (that is, commodity trading on SAFEX) as major reasons underlying increased investment within the sector (Kirsten et al., 2006). In fact, within the agricultural sector, new company registrations have increased rapidly since 1985, with the fastest growth experienced post-

Table 11.8 Descriptive statistics of wholesale-to-retail marketing margin (constant 2000 rand per mt)

	Phase 1: control period	Phase 2: partial reform	Phase 3: full market reform		
	5/1976–4/1987 (*n*=132)	5/1987–4/1991 (*n*=48)	5/1991–4/1994 (*n*=36)	5/1994–12/2007 (*n*=152)	5/1991–12/2007 (*n*=188)
Wholesale-to-retail margin (R/mt)					
Mean	1,062	1,158	1,467	1,717	1,669
Coefficient of variation (%)	11.1	13.6	8.3	23.7	22.9

Source: Traub and Jayne (2008).

1994; increasing from 895 per year in 1993 to 1,879 companies in 1997 (ibid.).

Market Performance

To assess market performance of the maize grain industry, we analyse the impact of retail maize meal price deregulation on wholesale-to-retail marketing margins.

Marketing margins

Ex post studies of the impact of maize market reform in Southern and Eastern Africa found that reforms led to lower maize milling/retailing margins in real terms (Arlindo, 2001; Jayne and Jones, 1997; Chapoto and Jayne, 2006). However, similar studies in South Africa have found that real maize milling/retailing margins in South Africa have increased significantly since the deregulation of retail prices in 1991 (Traub and Jayne, 2008).

Table 11.8 presents basic descriptive statistics of the calculated milling/retail margin over the three policy periods. This margin represents the processing plus retailing margin. Thus, the difference between maize meal retail prices and wholesale maize prices includes the value added from milling, packaging and transport of the meal to retail stores, and retailing. The processing of maize into meal produces byproducts that are sold to agro-industries as an input to animal feed and cooking oil. Therefore, the formula used to estimate the wholesale-to-retail maize margin, following Jayne et al. (1994) is:

$$MMt = P_{rt} - P_{wt} * z + [(z - 1)*P_{bt}], \qquad (11.1)$$

where P_{rt} equals the retail price of maize meal at time t, P_{wt} is the wholesale price of the maize grain at time t, z represents the average extraction rate of 1.80 tonnes of grain used, on average, to produce one tonne of meal, and P_{bt} is the value of the residual maize byproduct. P_{bt} is computed as 70 per cent of the wholesale maize price in month t, based on information provided by the commercial maize milling industry to researchers at the University of Pretoria (Kirsten, 2004).

The average milling/retailing margin accruing to millers and retailers within the maize sector increases with the transition from a controlled marketing system (Phase 1) to an open, market-orientated system (Phase 3). Between Phases 1 and 2, the average margin increased by 9 per cent whereas, between Phase 2 and the maize meal price deregulation period (5/1991–4/1994), the average margin increased by approximately 27 per cent. In the second subperiod of the full reform phase, when South Africa became a signatory of the WTO,[5] average milling/retail margins continued to increase while becoming more volatile.

Table 11.8 demonstrates a substantial widening of the wholesale-to-retail margin accruing to maize millers and retailers after the price deregulation in May 1991. However, this descriptive picture does not take into account changes in market conditions and other exogenous shocks such as weather, labour cost, and exchange rate volatility, which might be driving the findings. To control for these factors, Traub and Jayne (2008) estimated a reduced-form linear marketing margins model to measure the impact of pricing deregulation while controlling for labour costs, exchange rates, macroeconomic factors, seasonal factors and rainfall. They found that the deregulation variable has a significant positive coefficient, indicating that the conditional mean of the maize mill/retail margin increased after the deregulation of prices by R283 per tonne during the May 1991 to December 2007 period. This represents a 26 per cent increase over mean inflation-adjusted milling/retailing margins during the 1976 to 1991 period of controlled pricing. Their results also found a gradual upward trend in maize processing/retail margins over the entire sample period of roughly R1.7 per month.

Since maize meal is a staple food among the poor, the upward trend in monthly maize marketing margins is worrisome. Although more empirical research needs to be conducted to better understand the market structure and price formation in the milling and retail sectors, other studies have asserted that a concentrated market structure may be partially responsible. Bernstein's (1996) study of South Africa's maize sector, contends that the market was deregulated without considering the highly concentrated maize wholesaling, milling and retailing industries that had evolved during the control period. Chabane (2002) and Watkinson and Makgetla (2002) state that three of the privatized grain cooperatives, Sentraalwes (SWK), AFGRI and NWK, own a large share of the silo space in the country. An empirical study by Kirsten et al. (2003), shows that miller/retail margins respond to a rise in producer prices faster than when producer prices decrease, indicating a degree of market power along the maize supply chain. Daimant (2003) indicated that in 2003 two food-retailing companies, Shoprite Checkers and Pick 'n Pay, controlled 80 per cent of retail food sales; however, data on the concentration of maize meal sales among retailers are not available. Also, along the supply chain there is extensive shareholder affiliation between storage owners, commercial milling companies and retailing stores evident in the published financial statements of these companies.

Opportunities and Threats

To assess the opportunities and threats to the current maize grain system achieving a globally competitive and profitable sector, various stakeholders within the grain industry were consulted. These stakeholders include producers, traders and processors. The following discussion is largely based on personal interviews with stakeholders, the grain industries' strategic document, as well as the market performance assessment conducted in the previous section.

In general, three key challenges facing the maize grain industry have been identified (Botha, 2007; Hochfeld, 2007; Mogathla, 2007; SAGIS, 2005; Sandrey, 2007; Zunckel, 2007). These include:

1. *Constrained competitiveness and profitability* The range of factors constraining performance of the sector include:
   - high and increasing production costs, mainly for fertilizer and hybrid seeds;
   - deteriorating research and development infrastructure and capacity;
   - the need to ensure separation of generally modified (GM) and non-GM grain in all silos, as well as fully instituting the monitoring of the graders' system;
   - access to timely, relevant market information. Although market information is well developed and coordinated by both the public and private sectors, there is some concern regarding the distribution and assimilation of the information in disadvantaged communities;

- high transfer costs, especially for small-scale, emerging producers;
- the need for the development of alternative markets (that is, the biofuel industry) in light of inelastic demand, which causes prices to plunge in surplus production years; and
- access to international markets and trade policy – high subsidization of grain production in developed countries, segregation and identity preservation of GMOs, food aid and purchasing behaviour of relief organizations, and inefficiencies at ports all affect the access of domestic producers to international markets.

2. *Food security* Key factors constraining the performance of the sector to achieving food security include:
   - increasing staple food prices and lagging household incomes; and
   - inability of small-scale processors to emerge within the market, which impacts negatively on the land reform programme.
3. The disjoint between aggressive market reform and the government's commitment to BEE, land reform and accelerated growth needs to be addressed in order for the grain sector to meet its development objectives.

Given the challenges faced by the industry, we turn our attention to the opportunities and threats to the current system's ability to address constrained competitiveness and profitability as well as food security.

Three opportunities, the first of which could address profitability constraints while the second food security and competitiveness issues and the third black economic empowerment and successful land reform, have been identified:

1. *Expansion of maize grain markets* Domestic and international surplus production of maize can have a detrimental impact on the financial viability of domestic producers. Profitability of the maize grain sector is therefore dependent on its ability to expand market opportunities both domestically and internationally. Through the implementation of an appropriate biofuel policy framework, an alternative market for maize grain can emerge. A recent Policy Brief on the National Bio-fuels Strategy prepared by the Bureau for Food and Agricultural Policy (BFAP, 2007), illustrated that under a favourable policy environment, a local biofuel industry could be established and would boost local consumption of maize by one million tonnes. Most of the bio-ethanol would be produced locally to make up the

E8 blend and less than 10 per cent of local requirements would be imported. The biofuel industry would boost the agricultural sector's contribution to the economy by 4.3 per cent and more than 10,000 new jobs would be generated in the primary agricultural industry. The annual area planted under field crops would increase by 4.65 per cent (229, 000 ha). The existence of such an industry could result in an increase in both producer prices as well as price elasticity of demand for maize grain.

2. *Promotion of informal maize marketing channels* Market reform elsewhere in the region has led to lower maize milling/retailing margins in real terms. Two explanations have been given for the resulting reduction of maize milling/retail margins in these countries. First, market reform opened the system to greater competition as small-scale millers and retailers were now allowed to procure and transport grain across district boundaries. Second, newly emerging small-scale millers were able to produce a range of maize meal products and these marketing channels became the primary means by which low-income consumers procured their staple maize meal (Jayne and Argwings-Kodhek, 1997; Chapoto and Jayne, 2006).

   However, in South Africa, despite maize market reform, the processing and retailing margins have actually risen over the past decade resulting in maize meal retail prices in South Africa being generally higher than in any other maize-producing country in the region. Furthermore, unlike the other countries in the region, after the initiation of market reform, informal small-scale milling and retailing networks appear not to have developed appreciably in South Africa (Traub and Jayne, 2005; Vermulen and Kirsten, 2005; Hochfeld, 2007). This is especially puzzling considering that there is a very large wedge between producer prices for maize and retail prices of maize meal. This large wedge between maize grain and maize meal prices would seemingly provide a profitable space for investment in small-scale mills.

3. *Mentorship programs through existing market structures* More training and education is required for emerging small-scale participants. This improves the level of competitiveness and productivity of the resources. Partnerships between government and existing agribusinesses are crucial to transfer the high level of experience and knowledge of existing role players that have survived the free market environment, to emerging participants on all levels in the supply chain. Knowledge of the markets, technical issues and hedging mechanisms are essential if upcoming farmers or millers are going to survive in a modern futures-driven economy.

The potential threats to competitiveness and profitability within the grain sector can be divided into four categories:

1. *International market access and trade policy* Although South Africa has been successful in negotiating favourable terms of trade (see Section 1), they have to a large extent failed to implement the terms and conditions of the agreements and have not fully exploited the benefits available under their free trade agreements. In particular key factors that threaten to inhibit the access to as well as competitiveness of South Africa's grain sector within the international grain market have been identified. These include:
   - *Tariff application* South Africa has gone well beyond the mandate of the WTO's AoA when it comes to the application of tariffs. Bound rates tend to be far above the applied rates. For example, the bound rate on maize is 50 per cent while the applied rate is currently zero (Vink, 2007). Currently the calculation of import tariffs on maize is based on world prices and does not account for exchange rate fluctuations or country of origin (Meyer, 2005). This implies that if world prices are low a high tariff will be triggered, ignoring the impact of a possible weak exchange rate that could increase import and export parity prices.
   - *Utilization of policy tool boxes* South Africa is afforded various policy tool boxes under the WTO AoA that can be utilized to benefit the domestic industry without distorting the market or creating inconsistencies with the requirements of the various trade agreements. For instance, Article 6.2 of the WTO agreement, which allows for the support of resource-poor farmers in terms of infrastructure, general inputs and capital investment, provides newly emerging agricultural industries protection against 'normal competition'. However, these have yet to be utilized. Two key constraints to South Africa's ability to appropriately apply the various trade allowances include: first, poor communication and the general lack of cohesiveness between the governmental departments' objectives; and second, the lack of capacity within government departments (Zunckel, 2007).
   - *Enforcement of the SACU agreements* Within the maize industry there is concern over the enforcement of various SACU trade agreements. These concerns range from the enforcement of common SPS standards and GMO labelling within the region to rules of origin and trade rebates.
   - *Deteriorating infrastructure and transportation bottlenecks* Absence of significant levels of investment in infrastruc-

ture to support the agricultural industry is another constraint to profitability and growth (SAGIS, 2005). High transfer costs have detrimental effects on trade between markets. Within the grain industry, 50 per cent of all long-haul tonnage occurs on roads despite road transport being 30 per cent more expensive than rail (CSIR, 2004). Some reasons underlying the rail/road 50/50 split included rail capacity constraints, long wagon turnaround, lack of flexibility within the rail industry in order to take advantage of short-term export opportunities and/ or emergency food programmes, and to many small facilities spread all over the country (ibid.). To reduce transaction costs within the sector, public and private investment needs to focus on improving railway capacity and consolidating demand for grain transport by developing a Grain Clearing House which could consolidate all grain movement and management thereby reducing or eliminating operational inefficiencies. Such an investment would allow the consortium to move 7.3 million tonnes and therefore realize a savings of R219 million per year; an estimated cost saving on transport and storage of R30 per tonne (ibid.).

- *Inter-departmental communication and capacity* Two key constraints to South Africa's ability to appropriately apply the various trade allowances have been identified. First, poor communication and the general lack of cohesiveness between the government departments. For example, the lack of communication and harmonization creates a rift between primary and secondary (processing) industries since the NDA provides input on trade policies relating to primary products while the Department of Trade and Industry (DTI) provides input on trade policies relating to secondary products (Botha, 2007; Mogathla, 2007). Second, the lack of capacity within government departments serves as a constraint to the implementation of various trade agreement allowances.

2. *Research and development* From the expenditure patterns of the NDA, an increasing share of resources are focused on achieving the objective of an inclusive agricultural sector. However, if the goal of a globally competitive and profitable sector is to be achieved, the department needs to focus on increasing the share of its resources devoted to research and development, risk reduction through bio-security and disaster management as well as improvements in infrastructure – particularly logistical infrastructure. Such investments would benefit not only large-scale existing producers but also the newly emerging small-scale producers.

Given the assessment of the grain industry there are two areas of research and development that are essential to achieving the sector's goals:

- *Production* Need-driven research is a requirement to increase the competitiveness of the industry within the global market (SAGIS, 2005). In particular, research in the areas of biotechnology development, irrigation, soil sciences and plant protection.
- *Processing* As of 2002, the South African government implemented a food fortification policy which required all production-millers to fortify their end product with vitamin A. The current requirements of the policy do not apply to hammer-millers involved in custom-milling; however, if they expanded their services to include production-milling, their output would need to be fortified in accordance with the regulations relating to the fortification of basic foodstuffs (Department of Health, 2002). In its implementation of the policy, the government will need to address two key issues if small-scale production hammer-millers are to create positive benefits for consumers in terms of a low-priced maize meal alternative. First, maize meal produced by small-scale hammer-millers is not degermed and therefore has different nutritional benefits from commercially produced maize meal. There needs to be further investigation into the nutritional benefits of straight-run maize meal since the current fortification policy deals with degermed commercially produced maize meal. Second, there needs to be a study into the appropriate technology needed for hammer-millers to meet the fortification criteria. Currently the technology designed to mix in the required nutrients assumes a large-scale operation in that it requires a conveyor belt to obtain the optimal mix (Hendricks et al., 2001).

3. *Market information system* Research has shown that high transaction cost and risk can inhibit the development and growth of markets. These costs can be significantly reduced through public investment in market information systems and infrastructure. Within South Africa there exists a considerable body of market information compiled and organized by both the public and private sectors. The shortcoming of the information system, though, lies with the distribution techniques. There needs to be appropriate adaptation of market information to the communication facilities available to market actors, particularly the small-scale emerging market participants. Access to such information can improve production decisions and reduce risk.
4. *Land reform* There is obvious disjoint between aggressive market reform and the government's commitment to BEE, land reform and

accelerated growth. Since 1991, the aggressive market reform programme has left little room for government intervention to support producers. Due to the open markets and the globally competitive environment, commercial agriculture had to adjust and maize farmers adopted new technologies and improved farming practices. In the past five years, the area planted to maize has fluctuated around a fairly constant average. However, the number of farming units has decreased, which implies that farming units are becoming larger in order to compete globally.

Within this globally competitive environment and deregulated market, the government wants to establish emerging small-scale maize farmers on very small farming units (as small as five hectares) and expects them to be competitive without any supportive infrastructure, knowledge and experience, and above all, support from government. This can be referred to as the disjoint between aggressive market reform, land reform and accelerated growth.

3 POLICY ALTERNATIVES

On the basis of the assessment of the current policy set, we consider alternative interventions that could, in part, overcome the limitations in achieving a profitable and competitive grain sector as well as food security within South Africa.

Promotion of Informal Maize Marketing Channels

The observations of a relatively large wedge between maize wholesale and commercial maize meal prices, coupled with an apparent lack of investment response by informal small-scale processors and retailers provided the motivation for the Eastern Cape case study conducted by Traub and Jayne (2005). Their objectives were to measure actual and potential consumer demand for the types of maize meal capable of being produced by small-scale mills, and to measure the potential impact of small-scale grain retailing and milling channels on households' disposable income and food security. The study highlights three main findings:

1. The maize marketing system in the Eastern Cape is not articulating the preferences of many consumers. About 38 per cent of the respondents reported having purchased maize grain locally or used the services of small informal maize mills over the survey year. However, of these respondents, 23 per cent stated that there are periods of the year when

they would have wanted to purchase maize grain but it was unavailable in their area.
2. A large share of consumers reported that they would purchase hammer-milled maize meal from informal millers at a price discount rather than commercial sifted meal. For example, 69.4 per cent of all households surveyed preferred straight-run maize meal to commercially produced sifted meal at a price discount of 29 per cent. Given the current market structure between August and October 2004, consumers within the survey area were able to source packaged meal through retail stores at prices ranging from R36.71 per 12.5 kg bag of super-sifted. Alternatively, if the informal market could reliably provide maize grain for milling, consumers could have paid between R21.77 and R23.34 per 12.5 kg bag; which is a price discount ranging from 36 to 41 per cent. Here the price discount is the percentage difference between the formal and the informal market prices. In the case of special maize meal, the lower-priced alternative could be produced at a price discount ranging from 25 to 30 per cent, while for sifted this range is between 3 and 10 per cent.
3. Consumers could benefit through the reduction in the proportion of monthly income devoted to maize meal purchases if the informal marketing and milling networks could be developed to operate throughout the year.

These findings hold some key policy implications imperative to increasing low-income consumers' disposable income and food security. Efforts to reduce costs within the maize marketing system and enhance low-income consumers' access to less expensive staple food will promote the country's objectives of national food security, efficiency and competitiveness. These include:

1. providing greater business and marketing management to small local business people to assess potential marketing opportunities;
2. exploring options to increase local maize grain production through improved seed varieties and extension services;
3. exploring maize meal dumping practices of large national millers into regional markets; and
4. re-evaluating the impact of the food fortification initiative.

Market Structure and Power

Although more empirical research needs to be conducted to better understand the market structure and price formation in both the milling and retail sectors, other studies have asserted that a concentrated market structure may be partially responsible.

Given the high degree of concentration as well as vertical integration along the maize meal supply chain, the government needs to investigate whether certain market structures and powers add to food price inflation and if there is a case to make against certain market participants, and then the government has to act. Under the Competition Act a Competition Commission has been established that has already dealt with a number of cases involving the abuse of market power to manipulate prices. Therefore, the Competition Commission should examine the market structures and concentration to get a clearer understanding of price formation from the maize milling to the retail sector.

Appropriate Policy Framework for a Successful Biofuel Industry

The biofuel draft strategy that was recently published by the government does not provide enough incentive for a sustainable biofuel industry to be established. According to a policy brief on the National Bio-fuels Strategy prepared by the BFAP (2007), very little biofuel production will take place under the draft strategy and the majority of biofuel will be imported. Alternative government policies and intervention are required to support the infant industry. Apart from boosting agriculture's contribution to GDP, the positive upstream and downstream effects also need to be taken into consideration. Future research should focus on the economy-wide effects of a biofuel industry and estimate the impact on rural economies. The BFAP policy brief indicates that supportive measures like import tariffs on biofuel and fuel levy tax exemptions are critical to ensure the establishment of a sustainable biofuel industry.

The biofuel industry around the world is highly subsidized and protected from competition. The least-cost and most-efficient producer of bio-ethanol, Brazil, also safeguards the industry by applying a 20 per cent import levy and maintaining a tax differential. The implication is that South Africa's domestic biofuel industry needs to be protected by an import tariff on biofuels, while there should be a low to zero tariff for feedstock, since there is the expectation that feedstock prices will increase due to increasing domestic demand for maize. The cost of information in the biofuel industry is very high because of the risk and uncertainty inherent in the industry. It is an infant industry and more time is needed to analyse various policy alternatives and better understand the trade-offs that accompany different policy packages.

Rethink Land Reform and BEE Programmes

Given the strategic importance of the land reform programme, the government needs to rethink its policy by recognizing the dualistic structure of the maize industry. This dualism results in the existence of two categories of market participants; namely, newly emerging black entrepreneurs and established large-scale commercialized participants. These two groups, within the reform context, face different requirements in order to achieve competitiveness and profitability. Even if the effectiveness of the land reform process is improved drastically, successful mentorship programmes are in place and farmers have access to credit and markets, the income generated by these small farming units will hardly be enough to support a family. Furthermore, these small farming units will find it hard to compete in the globally competitive environment. Therefore, emerging farmers will have to rely on off-farm income to make a living.

In rethinking the land reform policies, government should seriously consider alternative commodities and more-intensive farming units, rather than dry land maize farming for emerging farmers. Given South Africa's climate and soil, it is very difficult to be successful as a grain farmer on a small scale.

With respect to specific trade policies, in the end it is only the enforcement of the SACU Agreement that will have positive effects for the local maize industry. This relates to the enforcement of common SPS standards and GMO labelling within the region to rules of origin and trade rebates. South Africa is a net exporter of maize and, therefore, increased tariff levels will provide very little support to the industry.

4 CONCLUSIONS

South Africa's domestic and trade policy interventions that affect stakeholders along the maize supply chain are compatible in enabling the country to meet its international trade agreement obligations. For instance, with the enforcement of the Marketing of Agricultural Products Act, No. 47, of 1997, price controls along the maize and wheat supply chains were removed; export subsidies abolished; and a system of tariff rate quotas replaced import and export licences as well as quotas for maize and wheat grains. These reform measures are consistent with allowances available to the grain sector under the WTO's AoA.

Despite the consistency between the domestic and trade policy interventions within the maize supply chain, this is not enough to achieve the sector-level development goals as set out in the Strategic Plan for South

African Agriculture (NDA, 2006) and the Strategic Plan for the South African Grain Industry (SAGIS, 2005). In both these documents, the overall objective is to establish a globally competitive and profitable grain sector in order to meet the government's long-term goal of halving poverty and unemployment by 2014 as set out in the Accelerated and Shared Growth Initiative – South Africa (ASGISA) (Mlambo-Ngcuka, 2006).

The lack of implementation of the various trade and domestic policies coupled with decreasing government investment in infrastructure and research and development in the agriculture sector has resulted in negative impacts that are already beginning to show as the industry struggles to stay competitive.

NOTES

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2. Producer prices from 1975 to 1996/97 are from the Maize Board South Africa. From 1997/98 onwards, producer prices are estimated as the SAFEX monthly spot price minus the median transport cost from various production points to Randfontein.
3. From the 1975 to 1994/95 marketing seasons, wholesale prices were defined as the Maize Board's controlled selling price to millers. From 1995/96 onwards, millers' procurement cost of maize grain is approximated as SAFEX spot prices.
4. Retail prices were obtained from the Maize Board Annual reports from January 1975 to April 1994, and thereafter from the Central Statistical Services of South Africa (StatsSA) and the National Agricultural Marketing Council.
5. Although, not empirically tested, there exists a causal link between South Africa becoming a signatory to the WTO and the increased volatility in milling margins. Before deregulation, millers all acted as agents of the state and when the markets deregulated, a fixed import duty was imposed on maize meal in order to protect the domestic milling industry. However, under the WTO agreement, this import duty was found to be uncompetitive, and therefore was phased out over a period of 5 years. The fixed import duty was replaced by the variable import levy and millers have to survive in the new market environment.

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12. Maize trade and marketing policy interventions in Tanzania

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1 INTRODUCTION

This chapter analyses the strengths and weaknesses of current agricultural and other related policies affecting the maize marketing chain and suggests alternative policies and strategies for improving marketing and trade in the grain subsector. Following this introduction, Section 2 highlights the importance of maize in Tanzania. Section 3 reviews the maize subsector, covering production and domestic food demand. Section 4 analyses maize pricing methods and consequent price trends. Section 5 describes the key policies governing the food subsector and presents the objectives and key policy pronouncements to lay the ground upon which an assessment of the policies will be made. Section 6 reviews and assesses the strengths, weaknesses, opportunities, threats and performance of policies affecting the food subsector and maize in particular. Section 7 presents conclusions and proposes a number of alternative interventions and strategies to enhance maize value chain development.

2 IMPORTANCE OF MAIZE IN TANZANIA

The annual per capita consumption of maize in Tanzania is estimated to be 112.5 kilograms, with national maize consumption at roughly three million tonnes per year, contributing 60 per cent of dietary calories to the average Tanzanian consumer (FSD, 1992). Maize is grown in all 21 regions of Tanzania, on an average of two million hectares (about 45 per cent of the cultivated land in Tanzania). However, most of the maize is produced in the Southern Highlands (46 per cent), the Lake zone, and the Northern zone. Dar-es-Salaam, Lindi, Singida, Coast and Kigoma are maize-deficit regions. The construction of a modern maize market at Kibaigwa has turned Dodoma into a key maize marketing centre despite the fact that the region is in a low maize-producing zone at the centre of the country. Currently, Dodoma region receives maize from Iringa, Rukwa (South Tanzania) and Manyara (North Tanzania) regions, acting as a strategic maize marketing centre for the country. In surplus regions maize is both a staple and a cash crop. For instance, in the Lake zone, maize competes with cotton, Irish potatoes and cassava for land and labour.

The government regards maize as a key food security commodity for the growing urban population and for the many rural households who do not produce maize. The major subsector management challenge for the government has therefore been how to strike a balance between two competitive objectives: ensuring adequate returns to producers, on the one hand, and maintaining low prices for consumers on the other (Temu and Ashimogo, 1998). As a result, the rural and urban supplies of maize and other food crops have proved politically sensitive for the government and policy makers (see Bryceson, 1994).

3 MAIZE SUBSECTOR

Production Trends

About 85 per cent of the maize produced in Tanzania is grown by peasant farmers cultivating less than 10 hectares. The farming system is characterized by low use of improved technologies (fertilizers, seeds and husbandry practices), which results in low yields and slow productivity growth (MAFC, 2006). Only 10 per cent of the maize is produced on medium-scale commercial farms (> 10–100 ha), and the remaining 5 per cent occurs on large-scale commercial farms (> 100 ha). Between 1961–65 and 1985–95, national maize production has grown by only 4.6 per cent, of which 2.4 per cent was attributed to area expansion and 2.2 per cent to yield growth (Katinila et al., 1998). More recently, between 1996–97 and 2004–05, maize production registered an average annual growth rate of 5.1 per cent. Still, average yields are less than 1.5 t/ha, and there appears to be a long-term decline in yield levels especially in the high-potential areas such as the Southern Highlands (Moshi et al., 1990; NBS et al., 2006). Table 12.1 provides food demand/requirements and the self-sufficiency ratio for cereals, non-cereals and the aggregate food production between 1999–00 and 2004–05.

In 2000–01 and 2001–02 cereal supply was lower than the requirements for all the regions except Iringa, Mbeya, Ruvuma and Rukwa. According to the early warning and crop monitoring system under MAFS (2004, MAFC, 2006), Arusha, Shinyanga and Kilimanjaro are indicated as food-deficit regions. Informal cross-border trade is often alleged to be a

Table 12.1 Tanzania: food self-sufficiency based on domestic food crop production

Production year	Production (million mt)			Consumption year	Requirements (million mt)			Self-sufficiency ratio
	Cereals	Non-cereals	Total		Cereals	Non-cereals	Total	
1999–00	3.37	3.95	7.32	2000–01	4.79	3.09	7.88	93
2000–01	4.14	3.55	7.69	2000–02	4.96	3.18	8.14	94
2000–02	4.44	4.11	8.55	2002–03	5.11	3.27	8.38	102
2002–03	3.84	3.71	7.55	2003–04	5.09	3.27	8.36	90
2003–04	4.93	4.07	9.00	2004–05	5.24	3.36	8.60	105

Source: MAFS (2004).

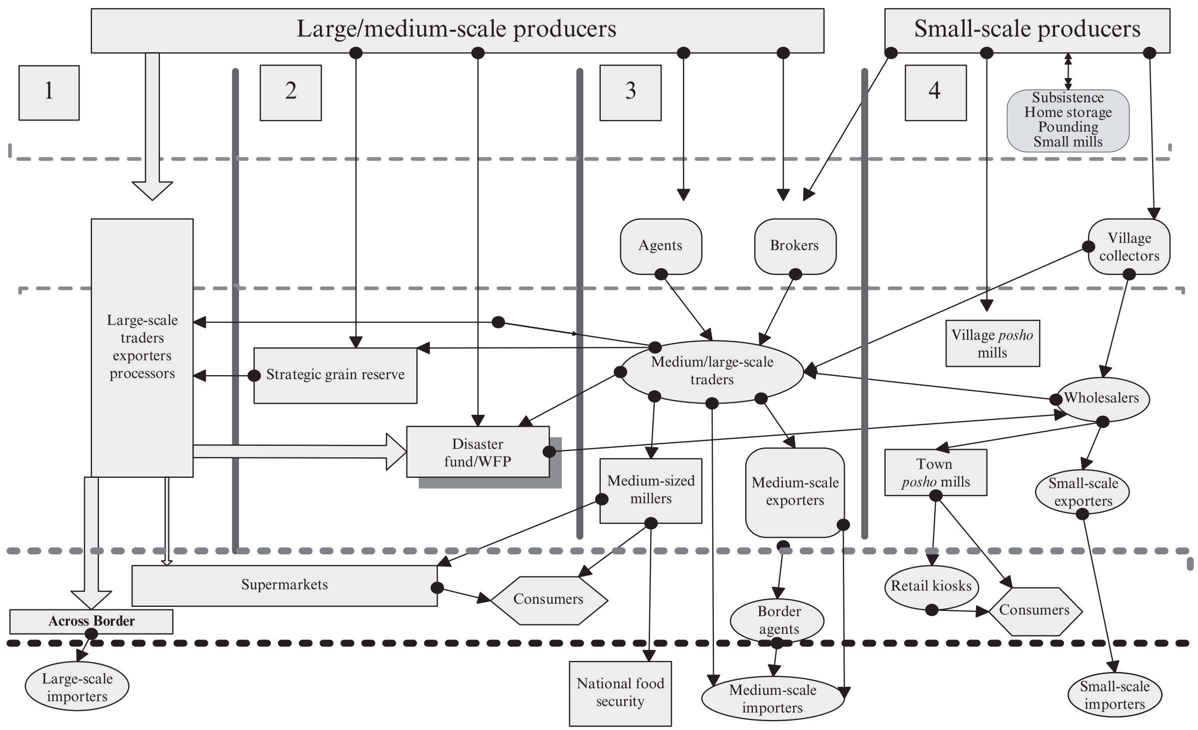
contributor to food self-insufficiency in these northern Tanzania regions (MAFS, 2004) because substantial amounts of these crops are seen to be marketed to the neighbouring countries especially Kenya. Although this could simply be a perception held by policy makers, it does influence decisions. There is no documented evidence of cross-border trade leading to food deficiencies, but considering high post-harvest losses and the tendency of farmers to sell almost all their production immediately after harvest at relatively low prices, concerns about food deficits should be expected. Whereas non-cereals production surpassed requirements for the five years, cereals were consistently in deficit over the same period.

Maize Markets: Liberalization, Marketing System and Chains

Market liberalization and the accordance of importance upon the private sector in grains marketing has led to the emergence of a vibrant, multiple channel marketing system, and value chains for grains. Figure 12.1 illustrates the typical maize supply and value chain in Tanzania as outlined by RATES (2003).

Large-scale grain traders

The first channel comprises the large traders/processors such as Mohammed Enterprises and Export Trading, Azam and Azania millers, which mostly buy directly from the large maize selling centres and integrate a number of the value chain functions. The large companies trade in maize, process it, and export both maize and maize flour. Azam and Azania flour millers export Tanzanian maize flour to Rwanda, Burundi and the Democratic



Source: RATES (2003).

Figure 12.1 Maize supply chains in Tanzania

Republic of Congo. They operate both in the southern and northern areas of Tanzania. Due to their volume of trade they are significant price setters in the maize subsector. They have a number of buying posts managed by their own staff, but they also buy through agents. Moreover, they have sizeable storage structures that enable them to buy large quantities when the price is low (peak season) and store until the price improves (low season).

The medium- and large-scale intermediaries (traders)

These are agents, brokers and traders who are able to handle reasonably large quantities. They buy from larger farmers, and indirectly from small-scale farmers through village assemblers/collectors. They sell to millers, exporters, the World Food Programme (WFP), and the large traders.

Small-scale producers' channel

Small-scale producers are the most important players in the maize marketing chain. After harvest, they store maize in their traditional cribs until they need to meet their financial needs. Selling is through village periodic markets and sometimes collection is done by visiting farming households, usually with the assistance of small traders known as village collectors who then sell the grains to wholesalers. Further distribution is from the wholesalers to town *posho* mills, which deliver the flour to consumers either directly or through retail kiosks. Small-scale exporters also receive maize from these wholesalers.

An additional positive development is the growth in the processing of grains. Along the marketing chain, many traders market grain rather than flour, except in Dar-es-Salaam where consumers prefer to buy flour. The packed flour business is growing fast in urban centres due to the rapid growth of urban populations and shifting preferences for convenience. Preparing *sembe* (white flour prepared from de-hulled maize) requires de-hulling, washing, drying and then milling, is time consuming and adds costs to households. In the larger urban centres, the commercial millers such as Azam, Azania and Nyire-Traders process and sell packed flour, which seems to increase the competitiveness of the market. The trading of maize grain had a small number of intermediaries and a large number of buyers with few barriers to entry. The number of private traders and the volume of private sellers has increased rapidly since the removal of restrictions (see also Santorum and Tibaijuka, 1992). These are all positive developments and strengths of the liberalization policy.

Maize milling

After trade liberalization, the government abolished the National Milling Corporation (NMC), a monopoly parastatal. The structure of the maize milling industry in Tanzania is now made up of three major types of mills: small hammer (*posho*) mills operating in rural villages and urban neighbourhoods; medium-scale millers; and large-scale millers. The small-scale hammer mills or custom mills dominate the major part of the maize mill industry in both urban and rural areas and are found all over the country, even in the remotest villages. Depending on the way they operate, custom mills can be distinguished into two major types. The first, and most common one, is the small hammer mill that provides services to individual households which process maize for direct home consumption. Of lesser importance are hammer millers who buy maize grain and mill and pack it for sale at kiosks or directly to the final consumer. Some millers combine these two functions.

The custom millers' main advantage is that they operate with high degrees of informality. Their labour costs are minimal and flexible. They are also in a niche market for individual households or food vendors who prefer a specific quality of maize meal. They also process finger millet, sorghum and dried cassava. In addition to human food, they also process animal feeds. The main challenges faced by entrepreneurs in this subsector seem to be the high start-up costs. Their business is also seasonal; high during the harvest season and low out of season. Retailing of the 'packed flour', however, is a year-round business.

Large-scale mills have an installed capacity of producing not less than 50 metric tons/day. Altogether, there are 10 large-scale millers in the country. Medium-size mills have a capacity of between 10 and 50 mt/day. Medium firms are mainly located in Arusha, and they include, Lucy Posho mills, Kiluvia Traders, Kenmill Maize Flour mill, Nyire Farm, Kijenge Animal Products and New Boogaloo Ltd. The medium- and large-scale milling firms are concentrated in the urban areas. The rest of the country depends mainly on small hammer mills.

Maize storage

There are weaknesses at this stage of the system. It is only the medium- and large-scale farmers, and traders, particularly the millers who have reliable storage facilities in Tanzania. Although there are structures, such as those constructed through donor support administered by the FAO in almost all the regions, smallholder farmers lack resources to manage such storage facilities. They fail to buy fumigants or to pay for storage space and time. Lack of storage affects farmers in two major ways. First, it compels smallholders to dispose of their produce immediately after harvest when prices are low. Second, any attempt to store the produce leads to post-harvest losses. To enhance grain marketing and trade, there is a need to develop strategies and innovative models for smallholder grain producers' storage facilities. Cooperatives and the NMC had established warehouses in various locations in the regions for collecting maize and other food crops. The national milling warehouses are currently used by the Strategic Grain Reserve (SGR). However, the policy and development interventions have not led to any significant private stockholding. Although smallholders store for short periods, usually less than six months, the losses are usually substantial, at times up to a quarter of the crop stored. Storage, if developed, would put smallholder producers in a better position to engage in the maize trade.

Maize Imports and Exports

Official statistics show that by 2005, maize exports standardized[1] values reached US$13.24 million. The ratios of export to import over the years suggest rising net exports. Significant volumes of maize are exported through the large-scale producers' chain. Maize produced by small-scale farmers is also linked to informal cross-border trade to Kenya in the north and Zambia and Malawi in the south. Weaknesses in this area are apparent, and are manifested by policy reversals. During 'bad years', the government sells maize directly to wholesalers from its grain reserves, including that of the WFP, for quick food supply to the affected areas. In 'bad years', the government tends to ban the flow of maize from one administrative region to the other, or from Tanzania to neighbouring countries. Such restrictions can also be imposed by the regional authorities, or even by the district and local government authorities. Such bans are often applied without critical assessments on the ground. They send conflicting messages about the policy stances by the government with regard to trade.

In addition, enforcing such bans is extremely difficult and expensive. Roadblocks are used but cannot be placed on all routes. Such roadblocks are also characterized by, or lead to, illegal trading and are subject to corruption. The result of this measure is not the containment of grain within the production areas, but rather a rise of transport and other marketing and trading costs, which ultimately increase the costs to consumers in the deficit regions. Usually, these interventions have been done on an ad hoc basis, sometimes at the 'discretion' of regional or district commissioners. Considering that a significant number of production regions are at the national borders, the suppression of internal grain flow contributes to informal cross-border trade as well as corruption. This is very typical in Rukwa, Mbeya, Arusha, Kilimanjaro and Tarime border outlets.

Current regulations also inhibit maize importation. Traders must obtain an import permit from the SGR and the Tanzania Food and Drugs

Authority (TFDA) Headquarters in Dar-es-Salaam. In order to get that permit, importers must have a trading licence and a Tax Identification Number (TIN) registered with the Tanzania Revenue Authority. The permit lasts for a period of six months and can be extended. Maize imports must meet East African Community (EAC) quality standards. The relaxation of these conditions is likely to result in higher levels of imports.

Food Security Policy Interventions: SGR, WFP and FACF Activities

Maize availability is politically sensitive, and has thus forced the government to maintain a more pronounced role in the market than has been the case with other crops. To address food insecurity the government manages two initiatives. One is a legislatively enacted intervention mechanism, that is, the SGR managed by the Food Security Department of the Ministry of Agriculture and the other is a set of food aid programmes notably, the Food Aid Counterpart Fund (FACF) and the WFP. The latter has mainly focused on the refugee challenge facing Tanzania.

SGR and WFP Activities

In adherence to the Food Security Act of 1991, functions related to food crops availability have been vested upon the Food Security Department. The government has been consolidating the SGR with the purpose of ensuring food adequacy in the country. The department was empowered to determine whether or not grains could be imported or exported depending on whether there are excesses or deficits (see MAFC, 2007). For instance, during the period ending June 2006, the SGR stock declined by 86 per cent to 15,560 metric tons from 112,823 metric tons recorded during the corresponding period in 2005. The decline was due to the distribution of relief food by the government to areas facing food shortages (BoT, 2006). The stocks in 2004 were low (an average of 54,366 metric tons) probably due to low production resulting from low rainfall in that year. In 2005, the weather conditions improved and the supply was high, with the SGR increasing its stocks to an average of 111,709 metric tons, with an anticipation of deficit in the coming years. SGR competes aggressively with local traders when buying maize from the farmers.

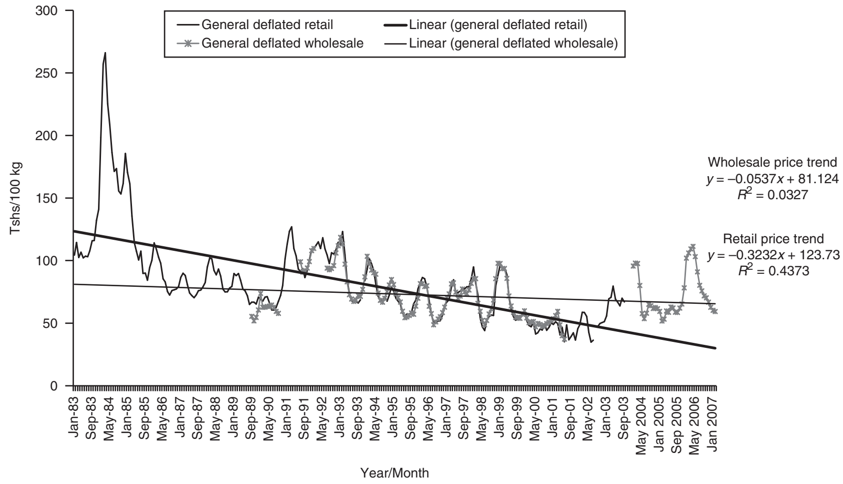
4 MAIZE PRICING METHODS AND PRICE TRENDS

There have been a number of developments in wholesale prices, retail prices and the stability of margins. Following trade liberalization policies that commenced in the late 1980s, the government abandoned official price setting for food crops. Since then, market forces have played an increasing role in determining the price of food crops, including maize.

Figures 12.2 and 12.3 present real maize price trends, that is, nominal prices deflated using the general consumer price index (CPI) and non-food CPI, respectively.[2] Overall, the real retail price of food has been decreasing since the early 1980s, indicating that the general price inflation was higher than the increase in maize prices. By contrast, real wholesale prices remained relatively constant over time. This relationship between wholesale and retail prices indicates a decline in vertical marketing margins, that is, a general decline in consumer prices (retail) with minimal changes in producer prices (wholesale).

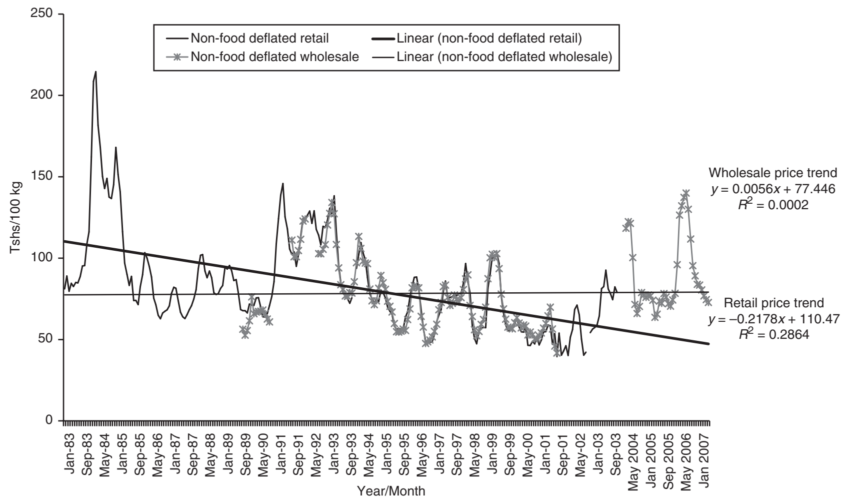
After liberalization, the ratio of retail to wholesale prices within markets shows a decreasing trend. This reflects decreasing marketing margins within the market after liberalization. This may have resulted from improvements in the overall market performance and/or as a result of an increased competition in the market following the entry of more private traders, as noted earlier.[3]

Van Campenhout (2007), using price data from 1989 to 2000 for seven maize markets in Tanzania, found heterogeneous results on the degree of integration between markets throughout the country. Transaction costs were highest between Iringa (reference market) and the markets in the East (Morogoro and Dar-es-Salaam). Dodoma seems to be best integrated with Iringa as a result of being the shortest distance despite a poor road. Van Campenhout concludes that the transaction costs decreased over time. Dar-es-Salaam–Iringa and Songea–Iringa trade routes saw a reduction of costs of only 8 per cent while other routes saw more than a 25 per cent decrease. The speed of price adjustment was found to be largest on the Dodoma–Iringa route. Therefore, national retail and wholesale price relationships may not reflect the real situation in the market without taking into account spatial factors. In addition, it is likely that the decrease in transaction costs is associated with the change in the structure of the market after liberalization because traders have become much more vertically integrated over time. A vertically integrated trader internalizes both wholesaling and retailing operations, and the millers have internalized raw material procurement operations, now buying directly from regional markets. In such a structure, the price spread between wholesale and retail prices may not reflect the true marketing margin as reflected in a weakly integrated market chain. This may explain why in the national retail–wholesale price relationships there is no margin between retail and wholesale price in some months while in other months the retail prices are slightly lower than the wholesale prices.



Source: Adapted from RATES.

Figure 12.2 Real retail and wholesale prices (deflated using the general CPI)



Source: Adapted from RATES.

Figure 12.3 Real retail and wholesale prices (deflated using non-food CPI), January 1983–February 2007

5 AGRICULTURE POLICIES AND INTERVENTIONS IMPACTING ON THE MAIZE SUBSECTOR

History: Policy Evolution

Immediately after the Arusha Declaration in 1967, the agricultural policy environment was characterized by more active interventionist approaches than was the case during the colonial regime. These approaches included the nationalization of private sector enterprises throughout the value chains of major export commodities. This resulted in the establishment of state farms, state processing and marketing enterprises, single marketing channels under the management of parastatals like the National Agriculture and Food Corporation (NAFCO), the NMC, cash crop authorities, and cooperative unions.

State-controlled production and marketing continued throughout the 1970s and 1980s. Economic and structural adjustment programmes started in the mid-1980s and the government gradually withdrew from production and marketing, allowing the private sector's participation in the value chain of most agricultural products including maize. Marketing and trade policy evolution is summarized in Table 12.2.

Current Agricultural Policy and Government Stance of Grains Subsector

The highest-level policy purview in Tanzania is Vision 2025, which seeks to change the country from a predominantly rural (where 64 per cent of the total population live) least-developed economy to a semi-industrialized middle-income country by 2025. The second-level overarching policy is the poverty reduction strategy. To achieve these overarching goals, the Agricultural and Livestock Policy of 1997 guides the agricultural sector (MAFC, 2007). Under the 1997 policy as well as in subsequent policy pronouncements, annual plans and annual budgets as presented in the years 2005, 2006 and 2007, the main planks of government strategies can be summarized as follows.

The government has formed the National Input Trust Fund under the Ministry of Agriculture to be a provider of credit to individuals/groups of people/companies involved in input supply in the country. Key targeted inputs include fertilizer and agro-chemicals. Several efforts, particularly those encouraging the private sector engagement have been institutionalized over time. For example, from a situation where the government was the sole supplier of seed, now the private sector is allowed to produce, distribute and market seeds. The production of breeder seed is done at public research institutes, foundation seed production on five foundation seed

Table 12.2 Tanzania: maize marketing and trade policy decisions and implementation, 1962–2006

Year	Marketing and Trade Policy
1962	Three-tier single channel marketing system was established
	National Agricultural Products Board (NAPB)
	Government had full control of food crop marketing
1973	Maize trading was centralized under one umbrella, the National Milling Corporation (NMC)
	NMC was established to buy, process and distribute food crops especially the grains (maize, beans). All other traders and consumers had to purchase maize grain or flour directly from NMC
1976	Government established crop authorities to replace regional cooperatives unions with the charge of managing crop marketing. Government announced the official price to be used in all regions. All farmers received the same price across the country
	Producer and other market prices were 'pan-territorial'
	Government provided subsidies to cater for some marketing costs
1984	Restrictions on interregional trade
	Cooperatives were reintroduced as primary marketing agents, having being abolished in the 1970s, and empowered as the sole official channel for purchasing crops from farmers after realizing that most crop authorities were relatively inefficient. Coops were then allowed to sell to adjacent societies or local retailers (Temu and Ashimogo, 1998)
	Restricted NMC's market operations as primary marketing agents
	NMC's mandate as the sole grain buyer and seller was reduced and it was left with the role of maintaining the grain reserve to ensure national food security, handling food imports and exports, grain milling and selling food grains and flour to urban and deficit regions
1987	Government removed all weight restrictions on interregional movement of maize
	Policy of official producer price was abandoned in favour of a policy of indicative minimum prices to be paid by the cooperatives and the primary societies to producers
	National SGR was established aimed at collecting and keeping stock for filling the gap during bad years. SGR was given NMC responsibilities to collect and store food for the nation during deficit years
	Free trade across the regions
	Government refrains from setting prices
	Market-determined prices for both grain maize and flour. Farmers, particularly those living in remote areas where transport is a problem, are paid less. Traders would only accept low prices to compensate for arguably high transport costs

Table 12.2 (continued)

Year	Marketing and Trade Policy
1988	Government, supported by major development partners, started economic and structural adjustments. This adjustment involved gradual dismantling of interventionist instruments in the economy in general and in the agricultural sector in particular. It allowed private sector participation in the value chain of most agricultural products
	Private traders were allowed to purchase from primary societies and cooperatives
	Grain marketing at the village level was by then confined to primary societies where producers had to sell their produce. Other participants such as cooperative unions, NMC and private traders were allowed to trade among themselves both within and between the regions. Further, NMC was no longer obliged to buy all the grains offered by the cooperatives and NMC had to operate on commercial basis. Widened the marketing boundary for smallholder growers
	Improved food supply in urban centres
1994/95	Direct purchase from farmers was legalized
	Phasing out of input supply and welcoming input and output markets to private traders following the abandonment of single channel marketing system under the control of NMC
	Trade liberalization took place; private traders were legalized to trade grains
	Crop boards were dismantled; the private sector had to take up this role of supplying agriculture inputs. Poor performance in this area is blamed for the deteriorating maize subsector.
	High variability in buying prices, price set by the market itself/traders
	Change in the pattern of both domestic and international food trade including maize
1996	Government lifted the ban to export cereals
1997	Policy document on Agricultural and Livestock of 1997 was published with statements on food crop production and marketing
	Emphasizes the need to develop and disseminate high-yielding varieties as well as reduced crop losses
	Government empowered traders to play a role in input supply chains as a replacement for cooperatives
1997	Parastatal reforms were designed to diminish the dominance and monopolistic characteristics of state-owned enterprises as part of wider structural adjustment initiatives whose funds launched the programme
1999	Re-establishment of new East African Community expanded the trade area, particularly on food products such as maize, beans and livestock. Evidence shows that there is a large volume of unofficial intra-regional cross-border trade within the EAC

Table 12.2 (continued)

Year	Marketing and Trade Policy
	EAC Treaty provides for the establishment of a customs union by 2009, which will create a single market of over 91 million people and a combined GDP of around $30 billion
2000	Marketing function was shifted from the Ministry of Agriculture to the new Ministry of Cooperatives and Marketing
	Pilot study on the warehouse receipt system in the country to support crop marketing, including maize
2003	National Trade Policy document published
2005	Marketing function moved to the new Ministry of Industry, Trade and Marketing. Cooperatives Department was then returned to the Ministry of Agriculture
2005	Policy document on National Agricultural Marketing Policy was prepared with statements to improving crop marketing in the country
2006	Significant maize imports
	Maize movement restrictions due to food shortages in the country

farms now under the Department of Research and Development, and certified production by contract growers vested in the Arusha, Morogoro and Iringa regions. The Tanzania Seed Company (TANSEED) is involved in both foundation seed farms and certified seed production. The Tanzania Official Seed Certification Institute (TOSCI) is responsible for quality control from the foundation seed farm stage up to the sale of certified seed to the farmers. The seed production system is governed by the Seed Act No. 29 of 1973, and the Seeds (Registration of Standards) Act. The private sector *per se* still plays a small role.

A new approach known as community-based seed production has been introduced as well, whereby selected farmers, who have received specific training in seed multiplication, are supplied with foundation seed which they then propagate under the supervision of extension workers. However, TOSCAI, a public organ, is responsible for inspecting the fields and the final product. Farmers sell the seed produced locally as 'Quality Declared Seed' with simple packaging and labelling, at a reduced price.

Extension services delivery is no longer a monopoly of the government. Private firms may own and manage extension services for specific enterprises such as beef, dairy, poultry, small ruminants, horticulture, tobacco and other subsectors which call for special attention. In areas where the private sector offers extension services by providing funding, planning, monitoring and evaluation, the government plays a coordinating role. The implementation of such public–private sector partnerships, however, is yet to play a significant role, except where the non-governmental organizations (NGOs) are involved.

Research remains a core function of the government. However, to increase investments in research on a sustainable basis the government encourages the active participation by quasi-public commodity/crop agencies in research funding and planning. These include cooperative societies, unions and commodity boards. Government funding seems to be directed more towards food crop, livestock, resource management and engineering research.

Following liberalization, agricultural marketing is now a key responsibility of the private sector. The government, on the marketing front, sees its responsibility as only being to strengthen competition. In some areas, the government facilitates procurement in order to promote quality, advocacy for rationalization of levies. The government also facilitates the collection and dissemination of market information. Since liberalization, it is widely accepted that, though liberalized, the food market is still performing suboptimally due to the lack of a strong regulatory mechanism, poor rural infrastructure and weak organization at the local grassroots-, especially village-level marketing.

It is the aim of the government to ensure that cross-border trade in food grains is legalized, facilitated and encouraged. However, as the assessment will show, food security and especially grain self-sufficiency imperatives often challenge the government to implement conflicting policies on this aspect.

Since the era of a parastatal monopoly, the NMC, the policy is to liberate the subsector and allow the private sector to play a greater role in milling and wholesale and retail distribution of flour. However, the government intends to maintain its responsibility of ensuring that milled products conform to quality prescribed by the Bureau of Standards. Second, the government encourages private millers to establish a direct relationship with producers through agents in order to facilitate credit and input delivery under contract arrangements.

Overall, the government policy to address food security entails strengthening and vesting strategic responsibility upon the food security department in order to enable it to manage the SGR efficiently, and advise the government on food security matters and import/export policy and procedures. However, the most pressing politically sensitive matter steering government policy is food security. Policy reversals in Tanzania, and intermittent actions that often go against the spirit of a market-driven food subsector, are experienced during the periods of crop failures and food insecurity.

Gender considerations also feature considerably in the agricultural and food security policies. A key aspect is that women in the rural areas play a critical role in food production, transportation, processing and distribution. The government aims to create an environment which will make women more effective in these responsibilities by enabling them to access land, credit, inputs and labour-saving technologies.

6 POLICIES AND INTERVENTIONS ON THE MAIZE SECTOR: A SWOT ANALYSIS

This section reviews the following government policies and initiatives: (a) sector-wide policies, (b) production and input supply policies and interventions, (c) market liberalization policies, (d) post-harvest strategies and initiatives, (e) food security policy, (f) trade-related policies and interventions in the maize market, and (h) taxation. The aim is to unearth strengths (positive results and positive trends) weaknesses, threats and opportunities that exist for the subsector.

Sector-wide Policies

Maize production statistics show considerable decline in the production of the crop during the controlled economy era. Annual production growth rates declined from 6.1 per cent in the 1970s to 0.9 per cent in the 1980s. Following reforms, maize production steadily increased, reaching an annual growth rate of 5.1 per cent from the mid-1990s to 2004–05 (Temu and Ashimogo, 1998). National policies have therefore generally been promoting maize production.

Yet the policies also manifest weaknesses in that they have not been able to 'transform' the sector. The production system has remained traditional, dominated by low-resource smallholder farmers and rain-fed dependent agricultural input delivery systems, and credit access and availability remain a major weakness. The use of subsidies is still insignificant. For example, Gordon (2005) reports that the fertilizer subsidy to farmers between 2003–04 and 2004–05 resulted in a reduction of retail price at the rate of only 8–10 per cent, increasing fertilizer use by smallholder farmers only very minimally and consequently has not contributed significantly to maize output. Moreover, farmers lack the needed collateral to acquire credit.

Production and Inputs Supply Policies and Interventions

In the 1997 agricultural and livestock policy, the government emphasizes the revival of a credit and input delivery system as a critical undertaking for sustainable production of food crops (MAFC, 2007). The government empowered traders to play a role in input supply chains to replace cooperatives. Since 1987, domestic agricultural input distribution has been open to private traders known as 'stockists'. Contrary to widespread expectations, the private sector failed to take up this role because private dealers (stockists) seemed unprepared to take the financial risks involved in handling chemical fertilizers and pesticides. Thus, input availability is still a challenge to smallholder producers. Furthermore, late delivery, high prices, quality assurance and lack of monitoring and evaluation systems remain major problems.

Market Liberalization Policies

The SGR is one of the key players in the maize market. SGR purchases are based on the projected national food situation and are designed to keep a stock of food that can sustain the country while preparing for imports within a period of three months. The philosophy behind SGR is that it buys maize at higher prices than the market price and sells it at market price or subsidized prices depending on the prevailing food situation. The tonnage bought depends solely on the funds allocated to it and the buying price. The SGR also offers premium prices to attract more purchases from smallholder growers. On some occasions, SGR fails to purchase its intended amounts when wholesale market prices are high. During good years SGR also sells its reserve to individual traders and replenishes its stock with new products.

Overall, the maize demand by the SGR is seen to some analysts as a positive intervention as it supports producer prices especially for those in the remote southern highlands, particularly the Rukwa and Ruvuma regions, and increases market competition. In 2006, it offered a price of TZS 75 (US$0.09) for one kilogram of maize compared to TZS 50–55 (US$0.06–0.065) in local markets. Although its quality requirements are stringent (such as a maximum of 13 per cent moisture content, 2 per cent broken grains and 0 per cent pest damage), farmers and traders prefer selling to the SGR (see FEWSNET, 2007). However, following liberalization, the role of the SGR has gradually diminished. One can argue that the reason is lack of adequate financing by the government. Nonetheless, competition from private marketers and traders, as a result of the liberalization policy, is a force to reckon with.

Some weaknesses have been noted in the operations of the SGR. The release of SGR grains during poor seasons or out of season precludes price advantages that stockholders would have benefited from during times of high off-season prices. The SGR therefore offers an implicit subsidy to maize consumers at the expense of producers. Analysts (see, for example, Nyange, 2000) argue that SGR procurement, both at border and producer markets, reduces price volatility whereas its releases increase volatility such that the net effect is detrimental for producers. They go further and argue that trade exhibits a much stronger price stabilization effect (reducing volatility) and that trade combined with regional food stocks (rather than national stocks) would serve better the food security objective. Tanzania needs further analysis of the SGR, combined with concerted efforts directed towards regional integration, to redress the argued negative effects of maintaining national stocks for food security.

The WFP also buys maize for food relief, from within or outside the country. The WFP is a preferred buyer by many large farmers because it pays a premium price for good-quality maize. Distortionary effects of WFP activities cannot be ruled out, both in terms of creating disincentives against domestic production and also by way of causing undue price volatility.

Beyond the SGR and WFP activities, the strategic importance accorded to the food sector has led the government to also use other innovative strategies. One example is the 'counterpart funds' used for buying food, especially maize. In such strategies, funds generated from selling grains in deficit regions are supposed to be directed to and invested in activities that would enhance agricultural productivity.

The key weakness of the system is that the end results of such innovative strategies are often unpredictable, principally due to 'fungibility' of such funds. For example, when importation is necessary, the government waives taxes to attract more traders to import more maize. Tenderers for counterpart funds also have ample room to manoeuvre. They enhance profits by bidding at times of low prices, or by hoarding stocks and releasing them at times of higher prices. The government's ability to monitor all these intricate processes is limited.

Post-harvest Strategies and Initiatives

The key elements of Tanzania's policies, rules, regulations and institutionalized processes that impact on the grain trade include the following: the National Trade Policy, export and import permits administration, tariff and non-tariff requisites and taxation. Closely related to these is the grain reserve and price stabilization policy.

The National Trade Policy (NTP), issued in February 2003, recognizes the importance of trade openness in raising efficiency and productivity in the economy, while, at the same time envisaging a role for the government in selective interventions. The NTP recognizes that export development requires going beyond the narrowly defined topics of tariff and non-tariff barriers, to address the various supply-side constraints that have hampered a positive supply response so far. Specifically, the NTP has identified the following supply-side constraints: an enabling business environment, soft and hard infrastructure, and market-supporting institutions.

Export and import permits

Both imports and exports of major food crops are subject to licensing. An exporter has to have a time-bound permit, normally of one month, stipulating the quantity allowed for the exportation. Exports to the EAC and COMESA (Common Market for Eastern and Southern Africa) countries require a certificate of origin from the Chamber of Commerce at a fee of TSh 20,000. Such a certificate has two prerequisites: a phytosanitary certificate and a sales agreement/contract specifying the crop being sold for delivery outside Tanzania. Although it is only a single day's process, all exporters across the country, even those at border towns with Kenya and Uganda, have to obtain the permits and certificates from Dar-es-Salaam – the capital city, sometimes as far away as 2,000 km. On the part of the importer, a permit has to be obtained from the food security department, also in Dar-es-Salaam. The process engages a number of other offices and steps. It is the cumbersome nature of the process and the distance to the capital city that hinders potential grain traders from engaging in the business.

Tariff and non-tariff issues

The key duty on maize is 5 per cent if imported from within East African countries and 25 per cent if originating from outside the EAC. The government, in addition, reserves the right to introduce periodic duties during times of crises. The non-tariff elements related to importation of grains are summarized in Table 12.3.

The table shows that there are substantial non-tariff barriers and requisites in the grain trade. The effect of this has been an increased illegal grain trade particularly where producers are close to external borders. On the positive side, Tanzania removed commodity export taxes that were common for all agricultural exports and varied as per government directives.

Food Security Policy

Tanzania's trade policies are very much influenced by the regional trade agreements particularly those of the EAC, the Southern African

Table 12.3 Summary of non-tariff requirements for importation

Non-tariff item	Description	Charges	Estimated cost per 1 tonne (US$)
Pre-inspection charges	Pre-inspection by COTECNA for goods of value greater than US$5000. Requires completed Import Declaration Form (IDF)	1.2% of fob	1.74
Phytosanitary charges	Phytosanitary certificate and fumigation (if required) Post-entry plant quarantine station inspection	US$15 per export consignment	15.00
Port wharfage fees	Paid to Tanzania Harbours Authority for goods while docked or leaving port	1.5% of cif	2.61
Tally fee	Payable to the shipping agency	US $1 per ton	1.00
TFCB booking fees	Tanzania Central Freight Bureau (TCFB) fee – for enforcing fair freight charges for exports and imports	2.5 % fob or cif	3.63
Clearing agents' fees	Agent fee	Negotiable as a % value of goods	
	Documentation fees	TSh 100,000 (estimated)	78.43
Loading and unloading	Re-bagging, transport, silo charges etc.	US$20 per tonne	20.00
Health and food safety standards	Tanzania Foods and Drugs Authority Permit processed in Dar-es-Salaam	TSh, 1000 additional testing fees	0.78
		Total	123.19

Note: fob = free on board; cif = cost, insurance and freight.

Development Community (SADC), COMESA and the World Trade Organization (WTO). As one of the founder members of WTO, Tanzania's trade policy is guided by adherence to WTO rights and obligations.[4] The country is therefore constantly making efforts to modify its policies to match with international trade rules. However, the general focus of the government on the grain sector has mainly been targeted

Table 12.4 EAC tariff structure, 2002–03 (%)

Nature of import	Uganda	Kenya*	Tanzania
Final consumer	15	35	25
Fully processed	15	25	15
Semi-processed	7	15*	10
Raw materials	0	0	0

Note: * For Kenya: unassembled or other descriptions.

towards improving food security in the country. Thus government policies have been prepared to favour imports rather than encouraging exports.

Trade-related Policies and Interventions in the Maize Market

Regional blocs such as COMESA (from which Tanzania withdrew) and the EAC promote 'maize without borders'. As Njukia (2006) observes, the major efforts to facilitate this have been targeted at reducing barriers to trade, such as provision of a maize traders' guide, a simplified customs document for cross-border traders for COMESA, training of cross-border traders with regard to grades and standards, customs and phytosanitary requirements, and duty reduction to zero within EAC.

Tanzania is also committed to promoting regional cooperation and it has been agreed in principle that the tariff regimes within the region are to be harmonized. These tariff regimes have been converging as each country is adopting common structural adjustment programmes whereby the tariffs are gradually simplified and the tariff walls lowered. The current tariff regime stands at three bands in Uganda (0, 7 and 15), four bands in Tanzania (0, 10, 15 and 25) and four bands in Kenya (0, 15, 25 and 35) (Table 12.4).

Taxation

Tanzania taxes both export and food crops up to the local government level. The effect of taxation is a reduction of farmers' revenue from crop sales because traders buy at lower prices to compensate for the taxes. The level of taxation varies across districts because taxes are collected by local government authorities (LGAs). LGA levies or cess were partly responsible for the low shares of producers' income from trade. In the 1992 Finance Act, the government directed LGAs not to tax agricultural

Table 12.5 Trade policy interventions

Year	Events
1983/84	Government implemented partial import liberalization by allowing individuals with own sources of foreign exchange to import incentive goods and sell them at market-clearing prices
1990	Government abolished import and export licences for various goods
1999	Government abolished stamp duty on agriculture and livestock products
1999/2000	Export ban was lifted to allow export of maize to food-deficit countries in Southern Africa
2004	Government through National Assembly passed a bill to prevent import of cheap/substandard products and dumping, to protect the domestic industry

Source: Summary prepared by authors.

products in excess of 5 per cent of the farm-gate selling price. The tax burden relative to gross margin analysed by the MAFC ASR in 2006 reveals that the impact is great. Local taxes subtract an average of 10 per cent of the income generated from the production of food crops (MAFC, 2006).

Incidences of Trade Policy Interventions

Restrictions for food crop export have been stipulated in the 1997 Agriculture and Livestock Policy for the purpose of keeping food for the nation (URT, 1997). Therefore, export banning has been undertaken through government pronouncement to serve the national interest when food shortage is forecast. Examples are shown in Table 12.5.

The NTP also provides room for using import licensing as a trade barrier, which requires legal procedures for individuals and companies wishing to import goods. The effectiveness of trade bans is evidenced through the power granted to the Minister of Agriculture to withdraw all export permits. This occurs only when the country feels that there is an extensive food shortage, hence the need to safeguard the available food. There have also been changes in maize tariffs and its products (Table 12.6).

Table 12.6 Maize tariff changes

Year	Tariff per product (%)	
	Maize grain	Maize flour
1993	20	20
1997	30	30
1998	24	26.57
2000	25	25
2003	21.67	25
2005	25	25
2006	25	25

Sources: Tanzania Revenue Authority Records (unpublished); Nyange and Morrison (2006).

7 ALTERNATIVE POLICIES, STRATEGIES AND INTERVENTIONS

The preceding sections have reviewed policies that impact on the maize subsector in Tanzania. The key message that comes across is that macro level policy position pronouncements (Vision 2025, The National Strategy for Growth and Poverty Reduction) are all supportive of the productive sectors, including food crops. The national policies are characterized by the drive towards liberalizing the formerly centralized economy where the state had a major role in the production and marketing of grains. The aim, since the mid-1980s, has been consistently to vest much more responsibility in the private sector. Overall, the policy stance is evaluated positively. There have been major achievements in the subsector. The decline in production noted during the peak of socialism has now been reversed and aggregate maize production is growing at a rate slightly higher than population growth. On the marketing side, there is notably vibrancy with many players, producers, processors and traders playing useful roles. Post-harvest handling of grains is improving with small- , medium- and large-scale millers consolidating their presence in the national and subregional markets.

There are, however, remaining challenges, the major one being that smallholder producers are not benefiting from the results of the liberalization policy. Neither their productivity, in terms of yields achieved in their farms, nor their participation in the markets has improved, by way of getting profitably integrated in maize marketing and trade. On the production side, expectations that the private sector will play a greater role in inputs and services provision have not materialized. On the marketing side, smallholder producers are weak individually and apparently farmer organizations have not proved useful in the maize subsector – except in a few cases where the public sector (domestic and international (aid)) has played major roles. There is therefore a broad range of policy initiatives and strategic sector development interventions that are needed to ensure that liberalization policies benefit smallholders.

This section summarizes the key issues from the preceding review, and highlights suggestions for approaches to face each of the challenges identified.

Alternative Production-augmenting Policies, Strategies and Approaches

A SWOT (strengths, weaknesses, opportunities and threats) analysis of production-related policies is provided in Table 12.7a. A holistic value chain approach is the most appealing way to address challenges being faced by smallholder producers in improving their link to trade. The policy and strategic interventions should address shortfalls from production to trade in a systematic manner, focusing on improving quality, processing, grades and standards, storage, pricing and value adding, that is, developing innovative products through maize processing. At the stage of production, the following approaches are suggested:

1. strengthening input supply and marketing systems;
2. facilitating importations of seeds by resolving constraints posed by tariffs, and domestic marketing of seeds including lower distributional costs;
3. improving domestic seed production systems including research and development of the same, pricing and establishing mechanisms for farmers' access to such seeds;
4. improvement of human resource and general smallholder manpower, and farmer training on specific maize growing packages; and
5. improving the maize production system, including increased introduction of irrigation with the aim of reducing risks.

Development of an Integrated Market-based and Private-orientated Extension Service

In the last two decades, the public sector extension services and input delivery systems have performed very badly. There has always been a vacuum in extension service provision to other support services such as agro-processing, post-harvest handling, storage, value addition and market linkages. This has hindered smallholder agricultural performance

Table 12.7a SWOT analysis: production-related policies

Policy intervention item	Policy strengths	Policy weaknesses	Strategic opportunities	Threats
Production Production systems Input supply Extension services Agricultural credit	1. Government withdrawal from direct production, marketing and trade 2. Confidence increasing in the private sector as the key player 3. Emergence of a sector governed by market forces 4. Reversal of declining maize production in 1970s–80s to a growing one in 1990–2000	1. Unclear priorities in public resource allocation towards developing crop subsectors 2. Policies have run short and failed to influence the transformation and modernization of the food subsector 3. Sector dominated by traditional, low-resource-endowed and -use, smallholder peasant farmers 4. Mainly rain-fed production system	1. Maintained food crop production comparative advantage in the Southern Africa region 2. Provisions and government advocacy towards developing PPS in agriculture sector for irrigation, input supply 3. Likelihood that LGAs, due to proximity and comprehension of local situations, will provide better farmer advisory services	1. Possibility of fatigue and despair about the liberalization policy 2. Constant fear of a possibility of food insecurity (inadequate domestic maize production)

Table 12.7a (continued)

Policy intervention item	Policy strengths	Policy weaknesses	Strategic opportunities	Threats
	5. Devolution and decentralization processes that vest much of the extension services in LGAs	5. Ineffective input subsidies and agricultural credit systems 6. Low levels of engagement of the private sector in input supply and extension services; contrary to liberalization expectations 7. Failure of the central government to honour and expedite decentralization and devolution to LGAs		

in terms of production, marketed output and gross value, with a consequent threat of an increase in rural poverty as elucidated in the SWOT analysis. The strategy and approach proposed here aims at filling this gap by promoting professional service provision from the private sector and targeting the supply chain in totality up to trade. Extension service is defined broadly as being one of providing all the services that farmers need to produce a cost-effective product and interface with suppliers and customers within the market.

Marketing and Post-harvest Handling

Table 12.7b presents a SWOT analysis for marketing and post-harvest-related policies. The analysis suggests that under marketing, attention should be paid to the following:

1. Developing national grades and standards and enforcing them. Note that whereas international standards exist, farmers and traders are not aware of them and even when known, smallholder producers may not be able to meet them. The take-off ought to be attaining a national grades and standards set-up, and then improving it towards international equivalents. Domestic marketing and trade must emphasize adherence to such grades and standards, and in turn, ensure quality guarantees to individual buyers, processors and exporters.
2. Investments need to be directed towards agro-processing to tap into high-value maize products including breakfast cereals (high protein maize) and high nutritive value foods, for example, those advocated for infants and even HIV/AIDS patients.
3. Storage and stockholding facilities are important functions if marketing systems are to work well and for trade to grow sustainably. Among cereals, maize suffers the highest post-harvest losses in Tanzania due to storage pests. Effective storage facilities and systems would also work towards reducing and allowing smallholder farmers to contend with price risks.
4. Where assembly costs are high, it would be worth advocating for the development of smallholder farmer cooperatives. Linked to this, contracted production, engaging smallholder producers, may also be possible for speciality varieties of maize – for example, those aiming at producing cereals, baby corn, tinned corn and so on.

With regard to the marketing policy, the following seem necessary to further support the current initiatives and achieve the above proposed measures:

Table 12.7b SWOT analysis: marketing and post-harvest policies

Policy intervention item	Policy strengths	Policy weaknesses	Strategic opportunities	Threats
Marketing	1. Clear signals of the role vested in and confidence conferred upon the private sector in produce marketing 2. Emergence of vibrant, multiple grain marketing channels 3. Enhanced competition among market players	1. Occasional policy reversals barring free marketing, often during years of relative scarcity 2. Smallholder producers manifest weaknesses and inability to profitably gain from the liberalized markets: ● weak farmers' organizations ● information asymmetry ● poor rural infrastructure	1. Demonstrated innovative farmer organization models (MVIWATA) 2. Demonstrated effective public investment in market centres and information systems that can benefit smallholder producers (Kibaigwa case) 3. Establishment of various buying centres as well as warehouse receipt system 4. Supportive revised cooperative policy 5. Establishment of Tanzania Agricultural Trade Information Centre Website (www.kilimo.go.tz) will enhance market information flow to various actors in the subsector	1. Enhanced poverty among smallholder maize producers

Post-harvest processes: milling and stockholding	Liberalization policy has led to: 1. End of NMC monopoly; reduced subsidy costs from government 2. Emergence of vibrant multiple maize milling systems: small, medium and large serving both rural and urban areas 3. Improved quality and variety of flour that is appreciated and accepted by consumers 4. Enhanced value added on ultimate marketed product (flour)	1. Smallholder producers participate minimally and accrue very meagre benefits from the evolving value chain 2. Continued reliance by smallholder producers on traditional storage and processing, resulting in high post-harvest losses 3. Lack of capital bars smallholders from developing post-harvest storage and processing systems; they fall prey to traders 4. Post-harvest benefits clearly benefiting more the medium- and large-scale maize producers	1. Potentials for contract farming and out-grower schemes to engage smallholders	1. Continued marginalization of smallholder producers 2. Enhanced poverty, food insecurity and its consequences: malnourishment

1. Further development of legal frameworks that would foster farmer groups to develop and operate as legal business entities; plus contract enforcement.
2. Reviewing the adequacy of rural infrastructure development and direct public resources (domestic and international) towards development of needed facilities.
3. Facilitating product development, and investments, in maize-based agro-processing to develop new products.

There is substantial evidence that improved marketing information systems enhance agricultural marketing and can conveniently solve smallholder challenges in participating in markets, as is the case in Tanzania. Information and communication technology (ICT) has a significant role to play. Good quality, reliable and timely market information on prices and trading opportunities reduce market risks and uncertainty of producers and hence can improve the nature and degree of market participation by smallholder farmers. The Uganda FOODNET, Kenya's KACE and Malawi's MACE are examples of market and information linkage services (MILS) that have great potential for linking farmers to markets, and these can be replicated in Tanzania. However, to adopt such an approach, Tanzania may have to address (i) any remnants of unfavourable legal and regulatory frameworks for agricultural markets, (ii) improvement of technical capacity for MILS, (iii) enhancing the local knowledge of the use for MILS in linking farmers to markets, and (iv) improvement of support structures such as effective warehousing receipt systems – all of which would buttress the effectiveness of MILS.

Pricing Policies

Table 12.7c provides a SWOT analysis of pricing policies. On the basis of the analysis, we conclude that pricing should be left to buyers and sellers. However, the government should maintain the responsibility of facilitating sound competition mainly by injecting public resources towards innovative mechanisms, even through public–private partnerships (PPPs), to ensure availability of market information. It may also institute regulations that will reduce barriers to entry, undertake market surveillance and frequently report about the market conditions.

Trade and Alternative Food Security Policies

Finally, Table 12.7d considers trade policies. With regard to food security, the analysis proposes making greater use of regional trade and strategic

Table 12.7c SWOT analysis: pricing policies

Policy intervention item	Policy strengths	Policy weaknesses	Strategic opportunities	Threats
Pricing mechanisms	1. Successful gradual liberalization from government fixed producer prices, to government announced indicative prices to full price liberalization 2. Market forces playing a greater role 3. Increased number of players in the marketing and trade of maize 4. Apparent competition in the market among traders 5. Manifestation of price patterns emerging from supply and demand forces: ● temporal price variability apparent due to seasonality ● declining trends in the ratio of retail/wholesale price, i.e. efficient markets ● decreasing marketing margins denoting improved distribution channels	1. Typical smallholder producers still lack organizational and technical capacities to effectively benefit from emerging pricing mechanisms	1. Liberalized market provides for alternative marketing systems for smallholders 2. Advancements in ICT, including internet and mobile forms provide room for innovative information systems	1. Further and more drastic elimination of smallholder producers in maize marketing and trade (could be argued as a positive development)

Table 12.7d SWOT analysis: trade policies

Policy intervention item	Policy strengths	Policy weaknesses	Strategic opportunities	Threats
Trade	1. Clear policies acknowledging the role of trade 2. Trade policy recognition of the need for addressing tariff and non-tariff barriers and border constraints 3. Greater responsibility vested in large-scale traders to function as importers and exporters of grains 4. Greater role that imports play in addressing food security during 'bad years' 5. Emergence of large-scale marketers and traders, which also	1. There remain tariff and non-tariff barriers that impact negatively on trade development: ● import permits ● fees 2. Policy reversals that bar trade nationally and also at local government levels 3. Unfinished regional blocs prevent harmonization of tariffs, e.g., the EAC 4. Continued reliance on suboptimal non-trade mechanisms to address food security 5. Lack of confidence by government in the private sector and the ability of regional trade to address food security concerns	1. Delayed harnessing of the full potential of the food production comparative advantage that Tanzania has in the region 2. Slow growth in international, regional trade including cross-border trade in Eastern and Southern Africa	1. Eastern and Southern Africa actively engaged in developing regional blocs. Trade, and that of grains in particular, could feature more strongly 2. There is already a vibrant cross-border trade, constituting 60–70 per cent of the whole regional maize trade. This is, however, frustrated by intermittent government restrictions and often classified as illegal 3. Maize without borders is already an accepted concept and is seen as a key strategy to enhance regional maize trade 4. Eastern and Southern Africa provides a maize market comprising 21 countries and a population of over 400 million people

	induces medium- and large-scale maize production that can reliably supply large-scale traders			5. There exist formative initiatives that could be further developed in the areas of regional grain market information systems: FAMIS, RATIN, and the SADC early warning system
Food security strategies	1. Elements of reliance on procuring maize within the country 2. SGR enhancing competition in the domestic market 3. Development objectives of counterpart funds	1. Imperfection and market distortions that go with SGR and counterpart fund programmes: ● SGR implicit subsidies to consumers at the expense of farmers ● ineffective redress of price instability ● fungibility effects of counterpart fund programme resources	1. Negative impacts and delays in enhancing trade as the approach to contend with grain scarcity	
Infrastructure: roads and energy	1. Recognition of the importance of physical and soft infrastructure for rural and agricultural development	1. Meagre resources for rural infrastructure development	1. Low levels of productivity	1. Donor community willingness to support local efforts by funding rural infrastructure development

regional arrangements to contend with periodic food deficits. The SGR operations, physical food aid imports, and counterpart funds are not the most efficient mechanisms and have the potential to distort resource allocation, production and marketing of domestic grains. The irony is that the focus of such trade policy finds itself in conflict with domestic interventions that bar intra-country and cross-border flows of grain, though intermittently. There is therefore a need to:

1. institutionalize regional approaches to enhance trade;
2. mainstream grain trade within regional blocs' development agendas; and
3. enhance regional harmonization of tariffs.

There is a need to continue with the efforts to reduce barriers to trade across borders and deploy customs officials to monitor and record transactions. The aim should be to facilitate trade and advise the government on how such trade can help the country to address any impending and potential maize food insecurity.

The government needs to specifically pursue further regional harmonization of external tariffs and the removal of intra-regional tariffs, harmonize trade policies, customs documentation, customs procedures, product quality and food safety standards, and rationalize sanitary and phytosanitary (SPS) measures and other trade-related institutions within EAC, SADC and COMESA. Red-tape barriers in particular are worth targeting with reductions in unnecessary documentation, permits and licences.

Public resources should be invested to ensure that grades and standards are harmonized and commonly adhered to across the region where grain is traded. To enforce proper grading, standards and subsequently pricing based on graded maize, will require developments in the area of technologies to sort and pack maize. Donor and NGO resources could be directed to this end.

There is also an urgent need to harmonize trade initiatives under the EAC, COMESA and SADC umbrella with WTO-compliant legislation to improve both regional and international trading.

Warehouse receipt (WHR) systems can be used to avoid decisions of selling simply due to cash needs that can be fulfilled through accessing credit. The WHR system can help farmers to benefit from price changes across borders and thus further improve their cash incomes. It would be beneficial to coordinate WHR systems and commodity exchange systems, and share best practices across the whole region.

Building on Food and Agriculture Management Information Systems (FAMIS), Regional Agricultural Trade Intelligence System (RATIS) and the SADC early warning unit and strengthening the regional agricultural information system would enhance the ability to instil confidence in governments on trade and on working with the private sector towards an effective regional grain trade.

An integration of the regional food reserves (SGRs) would foster the development of not only national reserve networks, but also a regional managed and coordinated food reserve system, allowing agencies to trade among themselves and among farmers and marketers in different countries, and to meet food requirements of a country facing deficit at any particular time. The SGR may also act as a supplier to traders. This could be complemented by institutionalizing consultations with the private sector in the region on issues of maize deficits and surpluses in the region and the potential role of trade.

Summary

The SWOT analyses and the alternative policies, strategies and interventions proposed under Sections 6 and 7 have been developed with the aim of providing a supportive role to grain marketing and trade. The major constraints to grain marketing and trade differ in importance among stakeholders and such constraints impinge differently on different stakeholders. Therefore, each policy alternative, strategy or intervention may have different impacts and implications across the stakeholders. Overall, however, the biggest challenge is that of integrating smallholder maize growers into the marketing and trade system. Ironically, although the issue at hand is trade, in Tanzania productivity is in disarray with yield levels as low as 1.5t/ha, to an extent that up-the-value chain initiatives, though important, will yield very little result if supply-side constraints are not addressed. A second major set of issues are 'behind the border' constraints on smallholder marketing and coordination within the maize value chain.

NOTES

1. According to FAO's FAOSTAT definition of standardized cereals.
2. Both retail and wholesale prices are deflated using the general and non-food CPIs, constant in December 1994. The National Bureau of Statistics effected changes in the weights of food and non-food in 2002. Therefore, the CPIs from January 1983 to December 2001 use 72.8 per cent weight for food and 28.2 per cent for non-food, whereas from January 2002 the weighting is 55.9 per cent and 44.1 per cent for the two categories, respectively.
3. There is an unexpected observation in that the retail price becomes lower than the wholesale price. The reason could be data limitations in that national averages have several gaps and/or there is a possibility that at local markets wholesale prices are consistently lower than retail prices, however when national aggregate averages are calculated then

retail prices drop. The most useful and reliable information in this case is only the overall declining trend of the ratio.

4. See Rutabanzibwa (2007) for a review of agricultural policies in relation to the WTO.

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13. Assessment of alternative maize trade and market policy interventions in Zambia

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1 INTRODUCTION

In the 1970s and 1980s, it appeared that much of Eastern and Southern Africa was on the verge of a green revolution. During this time, state-controlled marketing systems integrated input credit, input delivery and output marketing. Smallholder farmers were rapidly increasing their use of hybrid maize seed and fertilizer. Maize yields were rising impressively in countries such as Zimbabwe, Zambia, Kenya and Malawi. Most of these countries were largely food self-sufficient, and some were producing reliable exports to feed the region.

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

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

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

2 DATA

There are two sources of annual crop production estimates in Zambia, the post-harvest surveys (PHSs) and the crop forecast surveys (CFSs). Both surveys are large-scale nationally representative surveys, conducted annually by the Central Statistical Office (CSO) of the government of the Republic of Zambia (GRZ). The agricultural surveys cover a consistent set of crops annually. The CSO surveys are based on a sample frame of about 8,000 small-scale (0.1 to 5.0 hectares) and medium-scale (5 to 20 hectares) farm households. About 86 per cent of the farms in this nationally representative survey are in the small-scale category. For brevity, we refer to the full sample of both categories as the 'smallholder' sector.

We also draw on the online Food and Agriculture Organization Agriculture Statistics (FAOSTAT) data (http://faostat.fao.org/site/601/default.aspx) for trends in aggregate agricultural production indices.

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

3 HISTORICAL EVOLUTION OF MAIZE MARKETING AND TRADE POLICIES

The 1960–1990 Period

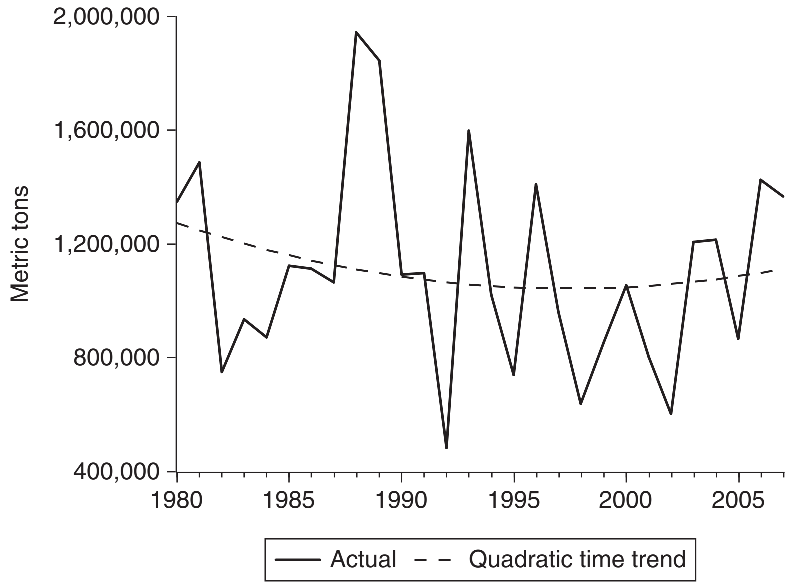
Starting at Independence in the mid-1960s, a prominent goal of government policy was to promote smallholder welfare, using maize production incentives as the main vehicle. This goal was achieved with great success in the 1970s and 1980s (Howard and Mungoma, 1996). Two main ingredients drove this production growth: (i) input and crop marketing policies, broadly defined, and (ii) improved seed breakthroughs. The key features of the marketing policies were (a) expansion of state crop buying stations in smallholder areas; (b) direct state control over grain supplies and pricing; (c) developing a system of cooperatives to link farmers to the services provided by the marketing boards; (d) heavy subsidization of fertilizer to encourage its use by small farmers; (e) efforts to stabilize and subsidize urban consumer prices without reliance on imports; and (f) shifting the massive costs of these government investments and subsidies onto the Treasury. Following independence in 1964, United National Independence Party (UNIP) government expanded the promotion of maize production by instituting a nationwide pan-territorial pricing policy, fertilizer subsidies and investment in government-led maize buying stations. The state invested heavily in crop-buying depots, first through the National Agricultural Marketing Board (NAMBOARD) and later through the Zambian Cooperative Federation and its member societies.

Improved maize seed varieties were the other central aspect of the maize production increase (Byerlee and Eicher, 1997). The germplasm produced by the Zambian maize programme from the mid-1970s through to the early 1990s induced a dramatic rise in maize yields in the 1980s (Howard and Mungoma, 1996). In all but the most difficult growing environments, the hybrids outyielded local (and improved) open-pollinated varieties even without fertilizer. But the improved maize varieties also raised the returns to fertilizer use, and clearly the seed, fertilizer and crop marketing investments were highly synergistic. Achieving these advances depended on access to international germplasm, breeding expertise and decades of sustained investment (Smale and Jayne, 2003).

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

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

Howard and Mungoma (1996) provide a detailed analysis of the rate of return to the maize seed research and marketing policies of the 1970s and 1980s. Their analysis explicitly includes the costs of a full range of investments leading to hybrid maize adoption by smallholder farmers. Marketing costs accounted for roughly 59 per cent of the total costs of all investments, in contrast to the seed research investments, which were only 3 per cent of the total. Extension and other service provision programmes accounted for the remaining 38 per cent. The rate of return on maize research was favourable when the costs of marketing were not included. After including the costs of all related investments (research, extension, seed and marketing), however, the average rate of return to maize research was negative over the 1987–91 period.



Source: Crop Forecast Surveys, CSO, Lusaka.

Figure 13.1 Maize production estimates, 1980–2007 harvest years

The 1990–2004 Period

Fiscal crises and increased donor leverage over policy pushed through by the government brought much tighter fiscal constraints on government activities in the early 1990s, and led to the infamous 'structural adjustment' and market reform policies designed to reign in state spending on agriculture to a level that could be sustained given its revenue base. Dissatisfaction with market reform was exacerbated by its association with a retreat from the 'social contract' marketing investments in support of smallholder welfare. The first 10 years of the post-1990 period have been associated with a decline in *absolute* maize production in Zambia (Figure 13.1). However, by the early 2000s, donors relaxed the condition that loans to government be linked to specific policy changes, based on the experience that 'buying' reform was an ineffective way to secure government commitment and ownership of policy change.

In fact, throughout the liberalization process, the government has remained a major player in both the maize and fertilizer markets, and continues to exert great influence over private trade decisions through import tariffs, export bans, marketing board operations and input subsidies. For example, in 1996 the government established the Food Reserve Agency (FRA), which was originally conceived to hold buffer stocks to dampen price variability and, when necessary, provide liquidity in the maize market while the private sector was establishing itself. Between 1996 and 2002, the government assigned the FRA to administer a fertilizer credit programme to farmers. However, credit repayments were dismally low, around 10 per cent (Smith et al., 2001), leaving the FRA in debt and unable to achieve its stated goals. After it came to light that many members of Parliament were in arrears to the FRA, its role in fertilizer distribution was transferred to a different government programme. After 2002, the FRA operations shifted to maize marketing and its role in maize trading has grown considerably. Although the FRA's original mandate did not include a price support function, the agency was instructed to purchase maize at pan-territorial prices fixed by government, including in remote areas where maize production for the market is unlikely to be profitable under commercial conditions.

In 2006, the FRA purchased 386,447 tons of grain from smallholder farmers at a price of 744,000 kwacha (roughly $190) per ton, which is estimated to be over 80 per cent of the national marketed maize output from the smallholder sector. The government has also remained involved in arranging maize imports, subsidizing the price at which it offers maize imports to large millers (Nijhoff et al., 2002; Mwanaumo et al., 2005). After accounting for FRA activities, government maize imports, discretionary import tariff rates and export bans,[2] the government clearly controlled most of the marketed maize output in the country.

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

There have been noticeable differences in crop production growth rates (Table 13.1). The worst performance has been registered for staple grains and beans, while impressive production growth has been achieved for cassava, sweet potatoes, cotton and groundnuts.

The well-documented decline in maize production has been driven largely

Table 13.1 Growth rates (% per annum) for selected crops produced by smallholder farmers, Zambia, 1991–2004

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

Source: Govereh et al. (2006), computed from raw PHS data, CSO, Lusaka.

by policy. During the 1992–2004 period, government support for maize production was reduced, but not withdrawn, as government treasury outlays for the purchase of maize were reduced, maize meal subsidies were eliminated, and massive fertilizer subsidy programmes were scaled back. Maize production in the more remote regions of northern Zambia declined substantially as areas formerly under maize were shifted to roots, tubers and groundnuts.[3] Cassava, sweet potato and groundnut productivity have all benefited from the introduction of improved varieties in the early- to mid-1990s. Cotton has also made big inroads. By 2003/04, one out of every five small farms grew cotton, thanks to substantial private investment in smallholder outgrower arrangements. Horticultural crops and animal products (while unmeasured in the PHS surveys) also appear to be growing rapidly.

Nationally representative survey evidence from 2002/03 indicates that 45 and 17 per cent of smallholder households derive income from the sale of animal and horticultural products, respectively (Table 13.2). The value of smallholder sales of animal and horticultural products are each almost as high as that for maize. Major production growth is being achieved in other unregulated crops as well, notably groundnut, soybeans and tobacco (Govereh et al., 2006).

Zambia's agricultural liberalization period from 1990 to 2004 thus presents a picture of declining maize production and rising production of many other crops. What has been the overall net impact on smallholder agriculture? Figure 13.2 presents post-1990 trends in inflation-adjusted value of total agricultural production from the smallholder sector, based on the PHSs. The total gross value of agricultural output stagnated for

Table 13.2 Farm production patterns of small- and medium-scale agricultural households in Zambia

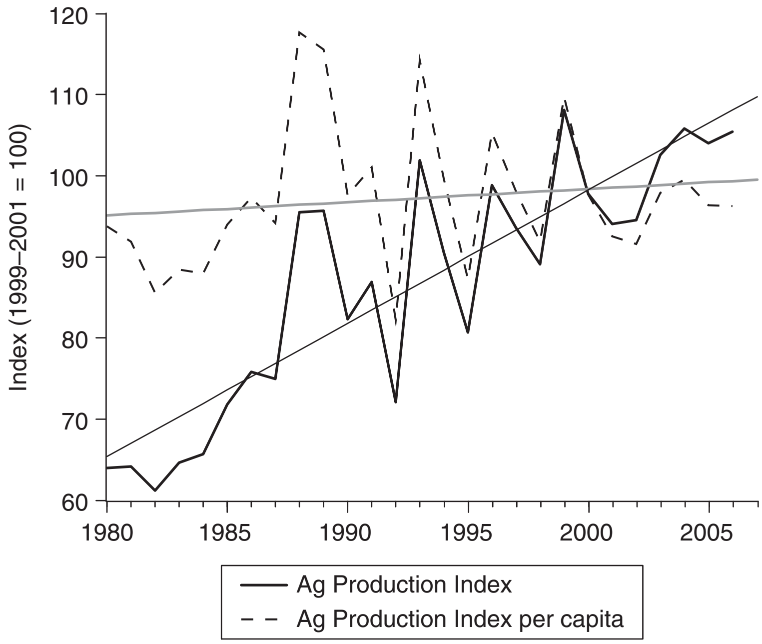
Farm enterprise	Marketing year	Farmers producing (%)	Total production (tons)	Gross value of production (000 US$)	Farmers selling (%)	Total sales (tons)	Gross value of sales (000 US$)	Sales as % of production – mean across households	Sales as % of production – national	Gross farm sales revenue – national (%)	Consumed on farm (tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Maize	2000/01	77.9	1,260,123	102,531	25.5	272,950	23,647	12.2	23.1	10.3	987,173
	2003/04	79.9	1,365,103	140,575	28.4	370,332	38,955	13.5	27.7	10.2	994,771
Sorghum	2000/01	12.4	41,976	4,653	1.9	3,614	398	6.1	8.6	0.2	38,363
	2003/04	10.3	40,887	4,574	2.0	5,378	602	7.7	13.2	0.2	35,509
Sweet potato	2000/01	27.6	178,863	8,466	9.8	37,869	1,711	18.4	20.2	0.7	140,994
	2003/04	18.8	138,227	5,127	7.7	51,581	1,918	24.6	37.4	0.5	86,646
Cassava	2000/01	37.7	794,824	19,383	12.7	87,776	2,117	10.6	10.9	0.9	707,049
	2003/04	38.8	836,057	50,905	11.1	70,491	4,339	9.2	8.5	1.1	765,566
Cotton	2000/01	5.7	43,359	10,491	5.5	41,938	10,147	96.6	96.7	4.4	1,421
	2003/04	10.5	123,085	31,259	10.3	118,461	30,087	96.5	96.2	7.9	4,624
Tobacco	2000/01	1.1	5,679	3,735	1.1	5,263	3,466	94.3	92.8	1.5	416
	2003/04	1.4	13,005	11,725	1.4	12,678	11,418	97.8	97.4	3.0	327
Beans and legumes	2000/01	13.0	27,297	7,735	6.7	10,782	3,088	29.7	39.9	1.4	16,516
	2003/04	17.2	35,460	9,423	9.5	15,704	4,177	30.3	44.3	1.1	19,756

Table 13.2 (continued)

Farm enterprise	Marketing year	Farmers producing (%)	Total production (tons)	Gross value of production (000 US$)	Farmers selling (%)	Total sales (tons)	Gross value of sales (000 US$)	Sales as % of production – mean across households	Sales as % of production – national	Gross farm sales revenue – national (%)	Consumed on farm (tons)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Groundnuts	2000/01	35.8	56,586	17,089	13.8	14,672	4,475	19.2	26.2	2.0	41,914
	2003/04	42.1	89,100	26,871	20.1	24,409	7,345	23.0	27.3	1.9	64,691
Vegetables	2000/01	–	–	–	20.8	–	25,699	–	–	11.2	–
and fruits	2003/04	–	–	–	16.3	–	35,427	–	–	9.3	–
Livestock	2000/01	–	–	–	32.3	–	13,058	–	–	5.7	–
products	2003/04	–	–	–	44.5	–	33,206	–	–	8.7	–

Notes: 2000/01 marketing year refers to 1 May 2000 to 30 April 2001; 2003/04 marketing year refers to 1 May 2003 to 30 April 2004. Horticultural (fruit and vegetable) production was not collected but sales were. Column 9 figures are computed as the weighted mean across all households level, i.e., (sales/production)*100. Column 10 figures aggregate total weighted sales and production across all farmers, then takes the mean of this, i.e. (total sales/total production)*100.

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



Source: FAOSTAT, http://faostat.fao.org/site/601/default.aspx, accessed June 1, 2008.

Figure 13.2 Trends in aggregate agricultural production, absolute and per capita, 1980–2006

the first half of the 1990s, but has risen by over 50 per cent between the 1997/98 season and the last three seasons for which data are available (2001/02 to 2003/04). As indicated earlier, activities believed to have grown rapidly in recent years (fresh fruits, vegetables and animal products) are not counted in a systematic way in these production statistics. The upward trend in Figure 13.2 is likely to underestimate the actual positive growth if these activities were included. Therefore, the overall picture indicates that, although maize production has declined greatly from former levels in the 1980s, to a large extent this decline reflects a shifting of land and labour into other crops, most notably cassava, cotton, groundnut, and probably horticulture and animal products as well.

The Period since 2005

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

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

Despite signing the regional trade treaties, the government has restricted maize trade through several legislations. Throughout the post-liberalization period, Zambia retained control over the flow of agricultural imports and exports through the Control of Goods Act, Agriculture Regulations. The Control of Goods Act empowers the Minister of Agriculture and Cooperatives to regulate the exit and entry of all types of agricultural products and byproducts, ensuring that they meet the sanitary and phytosanitary minimum requirements of Zambia and those of importing countries.

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

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

Table 13.3 presents the salient features and changes in maize marketing and trade policy changes, from 2000 to 2007.

4 EFFECTS OF POST-LIBERALIZATION MAIZE MARKETING AND TRADE POLICIES

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

As stressed by experimental design theory, the main problem with 'before versus after' assessments is that they do not control for other changes and processes affecting agricultural performance and that take a partial equilibrium perspective. In Zambia's case, we have shown in Section 3 that market liberalization, while associated with stagnation in maize production, has also been associated with a shifting of crop production to a range of other crops, with the result that overall agricultural production has been increasing at an annual rate of 2.0 per cent between 1990 and 2006. Because the reforms involved both the reduction in state support for maize production (during the 1990–2004 period) and the encouragement of private marketing and regional trade investments for a range of agricultural crops, it might have been anticipated that the reforms would induce shifts in cropping patterns in line with emerging regional comparative advantage. These crop shifts underscore the importance of a general equilibrium analysis as opposed to assessing the effects of reform based on a single crop.

This section identifies five main impacts of the maize trade and market reforms, as implemented in Zambia: (i) input use on maize and production

Table 13.3 Zambia: chronology of maize marketing and trade policy decisions and implementation, 2000–2007

Harvest year (marketing year)	Policy decisions and implementation
2000 (2000/01)	Maize and maize meal zero rated for VAT purposes
	Regional trade patterns emerge as maize is imported into Zambia through Eastern Province from Mozambique, mostly by small-scale traders, and maize is exported from Zambia to Congo's Shaba Province
2001 (2001/02)	July 2001 food balance sheet estimates 200,000 mt import requirement for maize. Import requirements are revised upward by some government statements to 400,000 mt
	August 2001 GRZ announces intention to arrange import of 200,000 mt maize at subsidized prices. GRZ tenders to select importers, maize to be delivered October 2001 through April 2002
	Private traders do not import, despite high domestic prices, because of fear of being undercut by subsidized government imports
	Maize and maize meal import VAT is zero rated, but export permits are not issued, effectively banning legal private export of maize
	Government financing of imports is delayed. Starting November 2001, food shortages emerge and prices rise well above cif price level
	Most government maize imports didn't arrive until December 2001 and January 2002 because of financing difficulties; cif prices reach \$220 to \$260, far above import parity
	By May 2002, only 130,000 mt had been imported under government programme
	Sales at subsidized price of \$160 per mt into mills. Selected millers receive subsidy of \$70 to \$100 per mt of maize purchased
	Government proposes the Crop Marketing Authority (CMA) as a semi-autonomous corporate body, a buyer of last resort whose main preoccupation is to stabilize prices and create markets in remote areas while procuring and selling at market prices and remaining self-sustaining
2002 (2002/03)	Millers' purchases of maize from the 2002 maize harvest are depressed by the availability of subsidized imported maize from the preceding drought year
	Government pressure on the millers to keep the maize meal price low constrains demand for locally produced maize, which is available at relatively high prices due to poor harvest season

Table 13.3 (continued)

Harvest year (marketing year)	Policy decisions and implementation
	The food balance sheet estimated that the 2002 harvest would lead to a food deficit of 600,000 mt. Consequently, an abnormally early price increase was observed in June 2002. Traders began to buy up maize in anticipation of further price increases based on the experiences of the 2001/02 marketing season
	Government entered into a Memorandum of Understanding with the millers to import 300,000 mt, government to import 180,000 mt as food relief and 120,000 mt as reserves
	The flow of imports was, however, slow because of a ban on GMO maize. Relief operators had to revisit their pipeline in order to supply non-GMO maize
2003 (2003/04)	Relatively good maize harvest. Maize and maize meal zero rated for VAT purposes
	FRA sold a total of 26,308 mt of the imported maize stock to the World Food Programme (WFP). Of this quantity, 22,126 mt were destined for export to Zimbabwe
	Government imports in response to the 2002 harvest were late in arriving, some only arriving as the 2003 harvest was being offered for sale. Several thousand tons of maize imports costing as much as US$ 270/t were arriving in Zambia as farmers were offering their new crop at prices below US$ 180/t. This scenario fuelled mutual mistrust between government and private sector in the maize market
	Export permits not issued, effectively banning maize exports
	Government legislation gives powers to local authorities to introduce local taxes. Inter-district grain levies put in place. In some districts, taxes on maize amount to roughly 10% of the price received by farmers for maize. These taxes indirectly impede the profitability of commercialized production
	Food Reserve Agency (FRA) purchases 58,250 mt maize in the 2003/04 marketing year
2004 (2004/05)	In 2004, maize and maize meal VAT status changes to 'exempt'
	Ministry of Agriculture and Cooperatives (MACO) sets up task force to provide planning guidelines for the establishment of the proposed CMA
	Large physical grain reserves, as originally proposed, would require an extremely large capital outlay, which would have a severe impact on the government budget

Table 13.3 (continued)

Harvest year (marketing year)	Policy decisions and implementation
	2004 harvest projected to be good and government announces a minimum recommended price of K30,000 per 50 kg bag or approximately US$128/mt. This price to be paid by the FRA to smallholder farmers in selected areas
	Millers lobbied for a lifting on the export ban on maize, in order to maintain demand and remunerative producer prices for maize farmers
	Government issues export permits to selected trading/milling firms
	Ministry of Agriculture and the Zambian National Farmers' Union (ZNFU) requests for an Agricultural Marketing Development Plan to be drawn, to structure MACO's agricultural marketing policies and programmes
	FRA bought a total of 105,000 tons of maize from farmers across the country starting in November to December 2004
2005 (2005/06)	National Food Balance Sheet presented to government showing an import requirement of 85,000 mt, but private sector estimates are 150,000 tons
	Government raises maize import duty to 15%
	Millers request import permits from MACO and duty waiver from the Ministry of Finance and National Planning (MFNP)
	In September, MACO announces lifting of import ban and that it will issue import permits for 150,000 tons to millers and 50,000 tons to FRA. FRA purchases 120,000 mt from domestic market at above market prices in deficit year
	Ministry of Finance and National Planning refuses to waive the import duty
	After heavy lobbying by all the stakeholders, MFNP agrees in late October to waive duty; MACO issues import permits
	Millers begin to contract for imports
	FRA releases 50,000 tons of maize at $210/ton in December, undercutting importers (cif import price stands at $266–287)
	MACO advised private sector to stop importing because they are failing to comply with new phytosanitary regulations
	President Mwanawasa declares a national disaster at the request of Parliament
	Mt. Makulu issues phytosanitary clearance; permits imports to resume
	President Mwanawasa announces that millers should lower maize prices significantly due to the abrupt strengthening of the

Table 13.3 (continued)

Harvest year (marketing year)	Policy decisions and implementation
	kwacha (up 26% in two weeks). Stakeholders meet with MACO to discuss the maize situation
	Import duty waiver extended to 31 March
2006 (2006/07)	Good harvest. FRA instructed to purchase 386,000 tons of maize at $190 per ton to support maize prices
	FRA price attract maize from Mozambique and Tanzania supplied by traders
	FRA allocated ZK 150 billion and borrowed ZK 150 billion but prospects of selling at a loss puts doubt on ability to repay the loan independent of subventions from the treasury
	Minister of Agriculture and Cooperative issues statement to begin allocation of export quotas to associations Millers Association of Zambia (MAZ), ZNFU and Grain Traders Association of Zambia (GTAZ) only
	FRA issued with export permit for 226,000 tons, ZNFU 20,000 tons, MAZ 40,000 tons, GTAZ 40,000 tons, WFP 10,000 tons (drawn from FRA). Another 35,000 ton tranche given to FRA
	FRA exported 114,000 to Zimbabwe but failed to export the balance of 137,000 tons because FRA priced itself outside the export market
	FRA has difficulty selling the maize in local markets due to good harvest and because of the above-market prices at which they purchased
	Government restricts export permits to traders and provides FRA with de facto monopoly on the export of maize; some permits were issued to traders later in the season
	Maize stock monitoring committee put in place to report on stocks monthly. MACO's rationale is to guarantee national reserves before issuing export permit and to supply maize meal at affordable prices
2007 (2007/08)	250,000 tons FRA carryover stock largest in FRA history
	FRA sought government approval to dispose of its old stock below the breakeven price by exporting to Zimbabwe at a loss
	FRA targets to purchase record crop of 400,000 tons by increased depots to 620 in 62 districts – 10 satellite depots per district and 62 holding depots
	Target for strategic reserves revised from 80,000 tons to 200,000 tons

Table 13.3 (continued)

Harvest year (marketing year)	Policy decisions and implementation
	FRA to pay ZK 39,000 per 50 kg bag and continues to attract maize from Tanzania and Mozambique
	FRA to get ZK 205 billion from government and plans to borrow ZK 200 billion from one domestic bank
	FRA issued with export permit for 50,000, MAZ issued with 50,000, GTAZ got permit for 50,000 and ZNFU had permit for 50,000 tons and there is a balance of 50,000 not issued
	ZNFU not ready to use 2006/07 allocation, keep extending the permit. Millers and traders quick to utilize their allocation

Sources: Govereh, personal notes.

levels have declined; (ii) real maize marketing margins and consumer maize meal prices have declined; (iii) real wholesale prices have remained relatively constant over the past 15 years in spite of a reduction in maize production; (iv) rural poverty rates have declined since the early 1990s; and (v) greater uncertainty in the policy environment has slowed development of the maize marketing system and had mixed impacts on the development of regional trade.

Reduction in Maize Production and Input Use on Maize

Evidence that national maize production has stagnated in the post-liberalization period has already been shown in Figure 13.1. The area planted, fertilizer applied, hybrid seed purchased and production have all declined since the late 1980s due to a combination of lower real producer prices, higher real fertilizer prices, deteriorating state marketing services, and a reduction in available state credit. Fertilizer use, which peaked in 1988/89 at 264,000 tons, declined to 97,000 tons in 1997/98. Hybrid maize seed purchases declined from 15,000 tons in 1989/90 to 4,799 in 1994/95. Maize area has declined by about 15 per cent since the height of state support to agriculture in the late 1980s.

Reduction in Maize Marketing Margins and Retail Consumer Prices

This subsection analyses the trends in retail maize meal prices and the wholesale–retail margins enjoyed by millers and retailers in Zambia since maize and maize meal prices were decontrolled in the early 1990s. All prices were adjusted by the 2005 consumer price index. Data were available for six markets (Lusaka, Choma, Kasama, Kabwe, Ndola and Chipata).

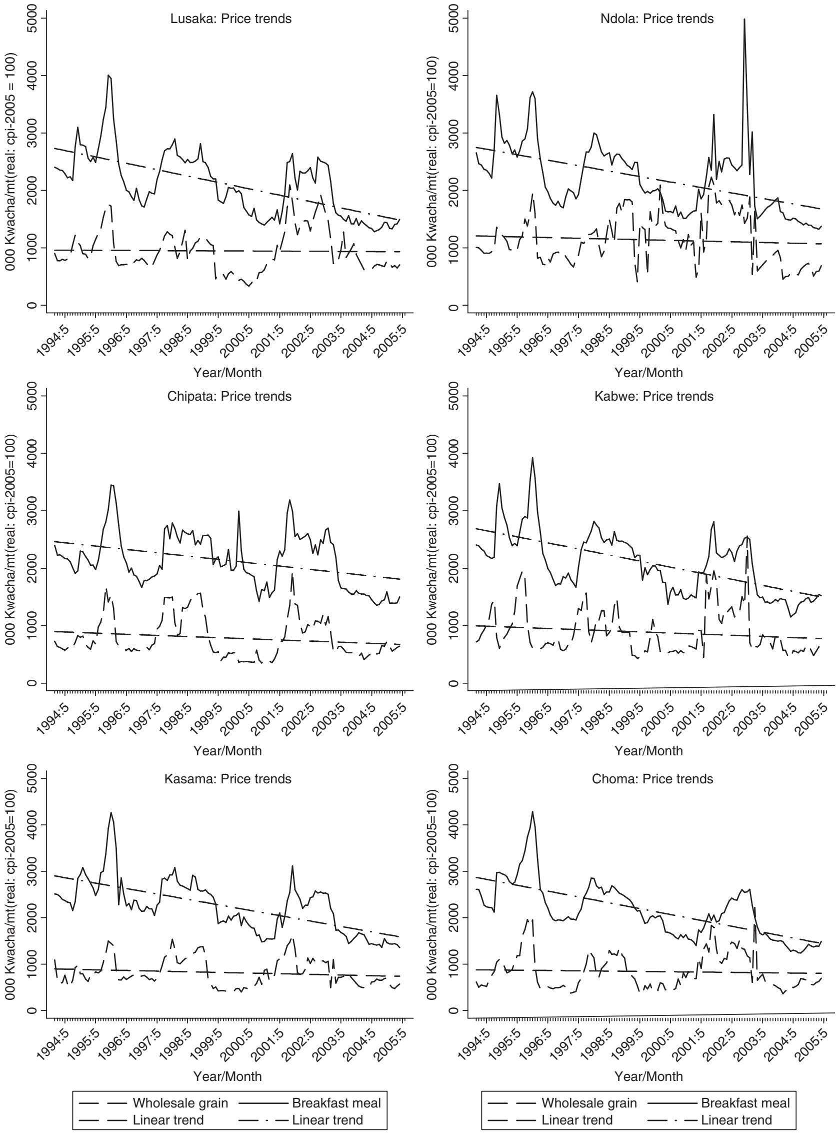
Wholesale-to-retail maize marketing margins have been trending downwards in five of the six markets for which data were available (the exception being Chipata). Ten years into the reform process, real breakfast meal prices have declined by 35 per cent, while milling/retailing marketing margins have been cut in half (Figure 13.3). Based on estimates of 3.5 million urban 'adult equivalent' consumers purchasing 120 kg of breakfast meal per year, the declining maize meal milling and retailing margins have saved Zambian consumers roughly US$29.4 million (123 billion kwacha) each year.

There are two main explanations for the finding that market reform reduced maize milling/retail margins. First, the reforms brought about a more competitive market structure. Rapid investment in medium- and small-scale milling and retailing networks occurred almost immediately after the reforms were implemented. In response to greater competition, the registered large milling companies cut their prices in an attempt to regain lost market share. Greater competition in milling and retailing exerted downward pressure on the milling/retailing margins of the large-scale firms' products, thereby benefiting consumers.

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

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

As shown in Figure 13.3, inflation-adjusted wholesale market prices have remained largely constant over time, although these prices exhibit great volatility. The fact that real wholesale prices have been roughly constant over time despite the stagnation of maize production growth amidst steady population growth is most likely due to the diversification of staple food consumption patterns. In particular, both cassava and wheat consumption appear to have increased dramatically over the past decade, moderating the impact of population growth on demand for maize and thus retarding upward pressure on maize prices.



Source: Agricultural Marketing Information Centre (AMIC) various years.

Figure 13.3 Trends in real wholesale maize grain and breakfast meal prices for six markets in Zambia between January 1994 and October 2005

The rise of cassava is not unrelated to maize market reform. The elimination of pan-territorial maize pricing policies in the early 1990s reduced the profitability of surplus maize production in remote cassava-surplus areas. Cassava production has risen substantially in many of the northern districts of Zambia. These shifts in production have apparently nurtured several highly productive, regularly surplus food production zones, which combine the production of multiple staples, and are generally characterized by relatively reliable rainfall conditions. Because farmers can harvest perennial cassava any time of year and over multiple seasons and years, they are able to respond very flexibly to crises as well as to chronic shortfalls in neighbouring regions.

Looking at Figure 13.3, the main episodes of maize price volatility occurred in the 2001/02 and 2002/03 production seasons. Both were drought years, but in both, prices exceeded import parity levels due to a lack of coordination between the public and private sectors. In July 2001, Zambia's national crop forecast and food balance sheet suggested a commercial import requirement of 200,000 tons of maize. In August 2001, the government announced its intention to arrange maize imports to be sold selectively to specified commercial millers at \$75 per ton less than the full cif landed cost at Lusaka. While import arrangements were announced in August 2001, very little government maize had arrived until December 2001. During this period, the private sector refrained from importing commercial supplies, based on the knowledge that subsidized supplies were coming into the country under the government import programme and that private imports would be uncompetitive in this situation. However, by the end of May 2002, only 130,000 tons had been imported under these government arrangements, not the intended 200,000 tons.

Late and insufficient imports under the government programme had two major effects: first, it stymied private market response to import incentives. Because the government arranged to supply selected milling firms with imported maize at a landed cost of \$160/ton, this ensured that these millers would have a major advantage in selling their products compared to other millers and traders who faced commercial import costs in the range of \$220–260/ton. This situation effectively froze out the market for all traders except those chosen under the government programme. The second outcome was temporary maize shortages and high prices. During the 3–4 months between the tender announcement in August 2001 and the arrival of the first substantial imported volumes in December 2001, local maize prices rose sharply and exceeded import parity levels (Nijhoff et al., 2002). The general public and some analysts have interpreted this situation as evidence of market failure, since in a well-functioning market, local prices should not exceed import parity levels. However, since the time when

Table 13.4 Trends in poverty, HIV prevalence rates and drought, Zambia, 1991–2005

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

Note: * The methodology and survey design used to establish these poverty rates differ from those used to calculate poverty rates in previous years, calling into question the comparability of the poverty rates.

Sources: Mason et al. (2006), drawing from the Zambia Poverty Reduction Strategy Paper 2002–2004 (2002) and CSO (2003). HIV Epidemiological Projections from CSO (2005).

wholesale maize prices started to be collected by the Ministry of Agriculture in 1994, these market prices have never exceeded import parity levels except when the government has taken responsibility for arranging importation.

Declining Rural Poverty Rates

Poverty rates in rural areas appear to be declining (Table 13.4). At the start of the liberalization process in 1991, 88 per cent of rural households were estimated to be below the poverty line. Following the major drought of 1991/92, the rural poverty rate increased to 92 per cent in 1993. However, since this point, rural poverty appears to have declined markedly, to 83 per cent in the late 1990s, and to 74 per cent by 2003. Estimates of 'extreme poverty' in rural areas have also declined over the past decade.

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

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

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

Greater Uncertainty in the Maize Marketing Policy Environment

Due to frequent policy reversals and changing government mandates, the policy environment in most countries in the region is more uncertain than during the control period. Survey evidence suggests that traders in many countries perceive the agricultural input policy environment as especially unpredictable and subject to change. The perceived threat of government re-entry into the market ranks among the major sources of risk of future investment (Jayne et al., 2006). Politicians' statements about private sector behaviour and the need for government re-entry into markets have been a relatively neglected variable in the analyses of private sector response to the reforms (Mwanaumo et al., 2005).

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

Moreover, 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 (Kopicki, 2005). While some analysts point to the large intra-seasonal price variability observed in countries such as Malawi and Zambia as indicators of weak private sector capacity and the limitations of market liberalization, the market environment in most of the region does not provide a meaningful counterfactual to assess the private sector's capacity to engage in inter-seasonal storage.

5 ALTERNATIVE POLICY OPTIONS AND THEIR LIKELY IMPACTS

The government, the media and local stakeholders have carried on continued discussions of alternative maize marketing and trade policy options. These include (i) reducing the role of the FRA in the maize market and reducing the discretionary role of government in general in the maize market, (ii) selling off or leasing government storage assets, primarily old NAMBOARD silos along the line of rail for use by the private sector; (iii) reducing controls on regional maize trade to support greater regional integration; and (iv) the need for greater government investment in public goods to facilitate the functioning of local and regional maize markets.

Reducing the Unpredictability of Government Operations in the Maize Market

The government continues to intervene directly in domestic and regional maize markets through: (i) somewhat ad hoc issuing of import and export licences (resulting in de facto export bans at times), (ii) unpredictable timing of changes in import tariff rates, and (iii) state importation and sale of subsidized maize to selected buyers; and (iv) poor coordination of imports:

1. *Maize export ban* The government has often imposed maize export bans (see Table 13.3). The implementation of these bans without prior notice usually strands private firms that have already sourced maize internally for export. For example, international firms such as Louis Dreyfus and Cargill which established their operations in Zambia soon after the market reform programme were forced to close their operations in 1996 after an export ban which was suddenly announced, causing these firms to incur large financial losses after having accumulated large maize supplies for export to the Democratic Republic of Congo (DRC).
2. *Maize import tariff rate uncertainty* Uncertainty as to timing of changes in import tariff rates causes firms' import decisions to be based on guesses as to when government will reduce or eliminate tariff rates rather than based on relative price differences between locations. Unanticipated tariff rate changes act like a random shock to the cost structure of regional trade for firms with no inside information. Firms *with* inside information have a competitive cost advantage in regional trade. Perceptions that some firms have access to inside information about the timing of discretionary government trade policy changes tends to impede investment by firms not having access to insider information. Over time, this restricts competition and impedes the development of a well-functioning regional trading system.
3. *Government disposal of maize in the domestic market below market prices* The FRA's disposal of maize in the domestic markets is not only selectively directed to millers but it is also done at below-market prices. This manner of operation crowds out private traders not having access to subsidized FRA maize, which can actually contribute to non-competitive behaviour in the market.
4. *Poor coordination of imports* In times of shortfall, the government allocates import licences for particular volumes. The manner in which these import licences are distributed is not transparent according to some traders and millers, and this has led to perceptions of favouritism in the allocation of import licences. Some firms complain that there should be no licences required for importation. For example, in an effort to protect poor consumers the delayed importation of maize by the government in 1999, 2001 and 2005 led to price surges well above the import parity (Nihoff et al., 2002; Mwanaumo et al., 2005). The upshot is that well-intentioned but poorly implemented government actions can exacerbate food price instability rather than reduce it.

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

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

There is something of a 'catch-22' with regard to the development of new (or rehabilitation of existing) storage facilities in many African countries, despite the critical need for additional usable storage space in many areas. Most of the grain silo space in Zambia remains in the hands of the FRA. Despite the fact that additional usable storage facilities are a major contributory problem to output price slumps during good harvest years, there is a lack of clarity about whether and how the non-operational public silos are to be sold off or transferred to private firms under a comprehensive restructuring process. This uncertainty impedes the incentives for new private investment in grain storage (Kopicki, 2005). There are worries that government storage facilities could be sold at discounted prices to politically well-connected firms or individuals starting up new marketing firms. Their subsidized cost structure would put other competing firms, which might otherwise consider paying full commercial costs for investments in storage, at a competitive disadvantage. Private investment in capital-intensive storage and other dedicated marketing assets could be rendered unprofitable if the FRA were to re-enter the market in a big way in the future, buying at above-market prices, selling at below-market prices, and covering its trading losses through the treasury. In this way, the uncertainty with regard to future maize marketing policy in Zambia is clearly impeding the development of the maize marketing system in a way that could over time allow it to reduce downside price risks for small farmers. Greater policy stability and future predictability of the policy and institutional environment are hence major priorities for supporting smallholder productivity growth.

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

Most large traders and millers in Zambia have gone on record as stating that it was important to have a national strategic stockpile of maize. However, there were wide-ranging views on how it should operate and what its optimal size should be. It is clear that if the national stockpile is managed in an unpredictable manner, the private sector would be likely to reduce its own storage operations. The phenomenon of subsidized government intervention in the market, or the threat of it, leading to private sector inaction, has been one of the greatest problems plaguing the food marketing systems in the region. Effective coordination between the private and public sectors would require greater consultation and transparency with regard to changes in parastatal purchase and sale prices, import and export decisions, and stock release triggers. As stated by Øygard et al. (2003, p. 65), ‘unless some very predictable and credible management rules can be established for the reserve, private agents will be reluctant to hold stocks, out of a fear that the reserve will be sold out at unpredictable times at subsidized prices, undercutting the value of their stored commodity’.

Cross-border Maize Trade Flows

Table 13.5 reports the formal maize trade flows (imports and exports) for Zambia by source over the 1999–2004 period. It shows that the bulk of imports during a deficit period come from South Africa (67.7 per cent) followed by Zimbabwe.

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

Table 13.6 shows the informal maize cross-border imports, exports and net exports from July 2004 to March 2006. A number of interesting findings

Table 13.5 Formal cross-border maize trade flows in Zambia: imports and exports

Source/year	1999	2000	2001	2002	2003	2004	Total	% of total
			Exports (metric tons)					
Angola	0	5	0	0	647	1,005	1,657	0.4
Botswana		418	491	232	1,513	3,108	5,763	1.5
Burundi	0	112	0	0.0	0	0	112	0.0
DRC	16,590	14,785	16,589	482	2,407	16,451	67,306	17.5
Congo, Republic of	0	0	652	1	0	0	654	0.2
Egypt	0	0	0	19	0	0	19	0.0
Kenya	0	0	0	10	0	2,479	2,489	0.6
Lesotho	0	90	25	74	150	1,177	1,516	0.4
Malawi	0	146	290	3,563	7,917	43,420	55,336	14.4
Mozambique	0	1	0	0	0	24	25	0.0
Namibia	0	0	18	612	375	597	1,603	0.4
South Africa	25	5,530	7,801	2,827	4,682	8,865	29,731	7.7
Tanzania	290	94	550	78	150	9,539	10,701	2.8
Uganda	0	0	33	39	0	61	133	0.0
Zimbabwe	7,801	2,824	730	223	20,792	171,327	203,699	53.0
Other*	513	189	31	332	353	1,921	3,342	0.9
Total	25,219	24,112	27,210	8,492	38,986	259,944	384,086	99.8

			Imports (metric tons)					
Botswana	35	115	45	1,061	218	0	1,476	0.4
DRC	0	2	44	284	330	0	661	0.2
Egypt	0	0	0	24	133	0	157	0.0
Kenya	8	116	499	1,612	1,711	12,769	16,715	4.1
Malawi	260	768	227	70	161	24	1,511	0.4
Mozambique	163	412	6	1	8,646	0	9,229	2.3
Namibia	136	155	120	75	28	68	585	0.1
South Africa	17,770	2,976	19,501	126,080	101,148	7,664	275,142	67.7
Tanzania	2,329	3,792	813	13,062	15,661	86	35,744	8.8
Uganda	0	0	0	13,062	0	0	13,062	3.2
Zimbabwe	8,456	4,984	5,932	9,703	2,455	1,882	33,415	8.2
Other*	256	524	847	9,547	7,391	138	18,704	4.6
Total	29,159	13,323	27,191	165,036	130,496	22,496	406,408	100

Notes: * Other: includes imports and exports from all other countries not in the Eastern and Southern Africa region.

Source: FAOSTAT online database, accessed August 2006.

Table 13.6 Measured informal cross-border maize trade from (exports) and to (imports) Zambia and net exports (mt)

Source	Jul–Dec 2004		Jan–Dec 2005		Jan–Mar 2006		Total (July 2004–March 2006)				
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	% of total exports	Imports	% of total imports	Net exports*
Tanzania	91	2,717	2	13,265	0	1,273	93	0.3	17,255	99.1	−17,162
Mozambique	0	0	0	49	55	0	55	0.3	49	0.3	6
Malawi	1,974	19	488	79	0	17	2,462	8.5	115	0.7	2,347
Zimbabwe	8,290	0	4,936	0	62	0	13,288	46.0	0.0	0.0	13,288
DRC	3,310	0	9,657	0	33	0	13,000	45.0	0.0	0.0	13,000
Total	13,665	2,736	15,083	13,393	150	1,290	28,898	100**	17,419	100**	11,479

Notes: * Net exports are computed as the difference between exports and imports. ** Figures are rounded.

Source: FEWSNET (2006).

are discernible. First the DRC is a major source of demand for Zambian maize and mealie meal with 45 per cent of the total informal trade exports from July 2004 to March 2006 going to the DRC. DRC buyers come to Lusaka to buy grain from the traders and millers, and pay cash up-front. Second, during the same period, 46 per cent of the total exports were from Zambia to Zimbabwe. Due to the foreign currency problems and controls in Zimbabwe there are reports that payments had become unreliable and firms are now reluctant to supply maize to Zimbabwean customers on consignment.

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

6 CONCLUSIONS AND POLICY IMPLICATIONS

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

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

It is unclear whether the resurgent government involvement in maize marketing and trade will lead to a shift in cropping patterns back to maize, as in the NAMBOARD days, whether this will dampen production growth in other crops, and how these developments will affect overall rural and urban welfare.

There are, however, a few clues based on applied analysis of household survey data to guide policy. Marketed maize output from the small farm sector is produced by a relatively small proportion of households, roughly 25 per cent of the total in any given year. Most rural households, and especially the poor, are buyers of staple food, and are directly hurt by pricing and trade policies to raise maize price levels. These considerations cast some doubt on the view that the FRA's resurgent maize purchase operations and associated import restrictions have benefited most rural farm households.

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

Follow Clearly Defined and Transparent Rules for Triggering Government Intervention

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

Ensure Grain Availability in Local Markets for Small Millers

Small-scale millers play an important food security role in the region. As long as grain is available in local markets, a large proportion of urban and rural consumers buy grain from local retailers and pay a fee to mill the grain into meal (*mugaiwa*) at a local small mill. *Mugaiwa* is usually considerably cheaper than packaged maize meals because of lower milling costs and fewer services (for example, no packaging). *Mugaiwa* also has a higher nutritional content than refined packaged meal. Urban consumer surveys in Zambia show that most of the urban poor rely primarily on small millers for their maize meal as long as it is available. Mwiinga et al. (2003) found that consumers eating *mugaiwa* could reduce their maize expenditures by 20 per cent in urban Zambia compared to those purchasing the same amount of packaged roller or breakfast meal.

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

Public Goods Investments

Many agricultural market failure problems in Africa reflect an underprovision 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, such as road, rail and port infrastructure, research and development (R&D), agricultural extension systems, market information systems, as well as institutional change to promote the functioning of market-orientated 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.

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 political economy less vulnerable to the effects of food price instability.

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

Rising land constraints will progressively encourage farmers to shift towards crops providing high returns to scarce land. Because much of Africa is experiencing increased land pressure and limited potential for area expansion, population growth is causing a decline in land/labour ratios and farm sizes are declining. Maize is a relatively low value-to-bulk crop that currently provides high returns to fertilizer application and land in a limited number of areas in Zambia. Given reasonable assumptions about the potential for future productivity gains, it is unlikely that maize will provide sufficient net revenue for most smallholder farms that are 0.5–1.0 hectares or smaller to generate substantial income growth, especially in the semi-arid areas.

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

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

NOTES

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2. Strictly speaking, export bans are not official government policy. However, a private firm seeking to export maize must first acquire an export permit from the government. By restricting the issuance of export permits, as it has since 2005, the government effectively bans private export of maize except for the few firms that are able to secure permits.
3. Some analysts contend that the increasing role of cassava, a drought-tolerant crop that can be stored in the ground, provides new potential to stabilize food consumption in the face of maize production shortfalls (Haggblade, 2006). The availability of a drought-tolerant crop that is less prone than maize to extreme production fluctuations provides some relief in the degree to which maize supplies can fluctuate from year to year without seriously aggravating food insecurity.

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14. Trade and market policy interventions: a synthesis of insights from research on Eastern and Southern African grain markets

Jamie Morrison and Alexander Sarris

1 INTRODUCTION

The chapters comprising this volume examine a wide range of issues central to the debates relating to the appropriate use of trade and related domestic policy interventions in the grains sectors of Eastern and Southern Africa (ESA). The objective of this chapter is to draw upon the wealth of information contained in the preceding chapters with a view to identifying, and commenting upon, a series of practical issues related to policy intervention.

It should be stressed at this juncture that a major difficulty in formulating clearer views on the role of trade policy is that appropriate policy interventions will necessarily be specific to the commodity in question, to the status of that commodity in the country in question, and to the stage of development of that country's agriculture sector, among many other factors. This context specificity makes it difficult to draw generalizations from theoretical, empirical and case-study insights. In considering the more general insights and conclusions developed in this chapter, this caveat should therefore be borne in mind.

This chapter first reviews the problematique in Eastern and Southern African grain markets in terms of weaknesses in their structures and their recent performance. It then discusses policy alternatives for addressing the problematique, drawing on both theoretical insights and on the case-study experience. Finally, it draws some conclusions on practical follow-up steps to improve both the debates around, and the formulation of, appropriate trade policies.

2 THE PROBLEMATIQUE IN EASTERN AND SOUTHERN AFRICAN GRAIN MARKETS

Food staples production and trade in ESA is taken as a focus for a number of reasons: (a) the importance of the commodities both as a component of agricultural production activities *and* as a component of household expenditure, with the resultant conflict in relation to the use of policies that affect food prices; (b) the existence of widespread market and policy failures, resulting in the significant constraints faced by the private sector in extending its role in food staples systems; and (c) the difficulties in identifying the appropriate balance between state intervention and the facilitation of increased private sector engagement.

The combination of these factors has contributed to a situation in which production has stagnated and where the sectors have become increasingly unable to satisfy either national or regional demand for food staples, visible in increasing trade deficits. This trend has implications both for policies to promote increased production and for trade policy in the context of greater regional and international integration.

The Trend towards a Net Grain Trade Deficit in ESA

Using data from FAOSTAT, Jayne, Chapoto and Govereh (ch. 6, this volume) demonstrate that, not only in the region as a whole, but also in the traditionally net exporting Southern African region, net grain export volumes have become negative. Similarly, Minot (2007) calculates that in terms of maize production, the region has moved from a surplus (123 per cent self-sufficiency) trade situation in the 1970s to deficit (97 per cent) in the mid-2000s. For wheat and rice, the decrease has been even more significant. Wheat has fallen from 93 to 56 per cent self-sufficiency, and rice from 87 to 67 per cent self-sufficiency.

Minot also provides a country-level analysis. Trends in many of the larger producing countries have been towards net import status. In the 1970s, South Africa, Kenya and Zimbabwe were maize exporters. Kenya started importing in the 1980s and Zimbabwe has been importing since 2000. During the same period, exports from South Africa fell from 2 million tonnes in the 1970s to an annual average of 0.14 million tonnes between 2000 and 2004. These examples are supported by evidence contained in the case studies in Chapters 9 to 13 (see Box 14.1).

Minot notes a number of caveats to the overall picture. Importantly, that the net trade position varies *within* countries. For example, maize exports occur from the Southern Highlands of Tanzania to Zambia, while imports enter through points further to the north. Maize is also exported

BOX 14.1 EVIDENCE FROM THE CASE STUDIES – THE TREND TOWARDS NET TRADE DEFICIT

Data presented in the country case studies are generally supportive of the observation of a general trend to net deficit, although significant inter-year variation (primarily as a result of climatic fluctuations) is evident.

In most years, Zambia is a net importer of maize. Formal exports were in the range 25,000 to 40,000 tonnes between 1999 and 2003, while imports ranged from 13,000 to 165,000 tonnes. An exception was 2004 where imports at 22,000 were greatly exceeded by exports of 258,000 tonnes.

Kenya's total maize output between 1988/89 and 2006/07 fluctuated in the range 2,089,000 to 3,248,000 tonnes. The country has, however, become a net importer. Official net exports exceeded 100,000 tonnes per annum in the late 1980s, but have been negative throughout the 2000s, reaching –202,000 tonnes in 2006/07.

In Malawi, maize production has fallen below national requirements during the last two decades. Malawi is a net importer in most years, with imports in shortage years of between 100,000 and 150,000 tonnes. The record harvest in 2006/07 was contrary to this pattern with exports of 400,000 tonnes to Zimbabwe alone under licence.

South Africa is an exporter, except for drought years when net deficits tend to be recorded. However, surpluses have been declining at an average of 60,000 tonnes per year between 1980 and 2006, although this rate of decline is now slowing.

Tanzania appears to be an exception. The ratio of grain production to national requirements increased from 70 per cent in 1999/00 to 94 per cent in 2003/04. This is reflected in a significant increase in recent years in the ratio of export to import volumes which rose from 0.78 in 1990 to 1.58 in 2005. It should be noted, however, that in many of the intervening years, the ratio was less than 0.2. Noteworthy is that the ratio of export value to import value increased only marginally from 0.56 to 0.62.

Source: Case study Chapters 9–13, this volume.

from northern Mozambique to Malawi, while imports take place further south.

Clearly, not all trade is recorded and hence trade figures may underestimate the degree of intra-regional trade. While focusing on cross-border trade in livestock, Little (ch. 7, this volume) suggests that significant amounts of food crops are cross financed through informal trade in livestock. Jayne et al. suggest that the extent of informal cross-border trade is much higher than previously thought despite considerable efforts to suppress it.

Chirwa (ch. 10, this volume) argues that informal trade thrives when bans are put in place. He reports that total informal imports to Malawi which have been in the range 75,000 to 165,000 tonnes between 2004/05 and 2006/07 almost matching formal maize import volumes. By contrast, informal export volumes (700 to 3,800 tonnes over the same period) are significantly less than formal exports. Govereh, Chapoto and Jayne (ch. 13, this volume) highlights the fact that measured informal trade, which between July 2004 and March 2006 accounted for 29,000 tonnes of exports from, and 17,500 tonnes of imports to Zambia, played an important price stabilising role in that country.

While there is consensus on the direction of change towards net deficit, the magnitude of future deficits is more difficult to establish given uncertainties related to a number of factors such as the impacts of climate change, developments in biofuel markets, and policy developments at the multilateral and regional levels. Changes in these parameters have not been systematically accounted for in forecasting models, which generally assume that policy interventions will remain the same over time.

Additionally, the lifting of domestic supply constraints could alter the picture substantially. For example, Minot (2007) notes that a relatively small increase in maize output could have large effects on net trade positions. If maize output increased by 10 per cent from 2000 to 2004 levels, Kenya would become self-sufficient, Zambia, Uganda, South Africa and Tanzania would shift from self-sufficiency to becoming net exporters, and the overall self-sufficiency ratio in ESA would rise from 97 to 107 per cent.

Sectoral Structure and Performance

In most of ESA, aggregate yields of staples, an accessible and available indicator of land productivity, have stagnated in the past 20 years. The reasons may well have to do with the evolving structure of staple food production. For instance the case studies documented (such as Kenya) find that the involvement of farmers with maize has declined considerably over the past five years. This may have to do with the increasing fragmentation of land due to population pressures, and the resulting unattractiveness of marketable staple cultivation. These structural changes, however, may be behind the productivity stagnation as well as a low degree of supply response.

Increasing staples productivity, in addition to reversing the trend towards net deficit, is often argued to be the only viable way of achieving the generation of the cash surpluses required to allow investment and diversification into higher-value activities and thereby to promote widespread structural change and poverty reduction. While some commentators may question whether the road out of poverty for rural populations is the promotion of staples, they generally do so without a convincing explanation as to how to promote the transition from the status quo high-level engagement in staple food production into the production and marketing of higher-value products.

Indeed, although many of the case studies in this volume document an increase in the share of other crops in the total value of production, they also stress the importance of broad-based staple food crop promotion.

However, even taking it as given that significant increases in staples productivity in aggregate will be required, this does not necessarily imply that *all* current grain producers will need to increase productivity and generate surpluses from their own land and capital resources. Indeed, a relatively small proportion of producers in most Eastern and Southern African countries are currently involved as sellers of food staples, and many of the producers who are net buyers of grain would anyway have limited capacity to physically increase production levels and/or access remunerative markets. For these households, returns to their labour used off their own farm, but to a large extent still in agricultural activities, offer a potentially more viable route to increased income levels.

Barrett (ch. 3, this volume) poses two important questions in this regard: 'First, does the household participate in the local market? Second, does the local market participate in the broader national or global market?'. He notes that it is often assumed that trade and price policy at the national level uniformly affects producer prices and therefore producer incentives. However, this relies on assumptions of both strong spatial price transmission and significant smallholder market participation in well-integrated markets. In many economies, these assumptions simply do not hold.

In this context, Jayne et al. make the critically important observation that smallholders are generally engaged in a different value chain from the more commercialized farmers. They describe formal channels, which link commercial farmers to large grain trading, processing and retailing firms as being characterized by commodity exchanges, networks of integrated silos, millers and supermarket retailers, often with transnational firm ownership, accessible market information, large transaction volumes, well-specified grades and standards, and legal systems that accommodate more sophisticated contracting arrangements. This contrasts with informal chains which are characterized by spot market transactions, small percentages of production sold off the farm, weak road and communications infrastructure, weak information systems, and limited coordination between input delivery, credit and sales.

Answers to questions such as those posed by Barrett are critical in determining the appropriateness of alternative interventions designed to increase smallholder participation in more commercially orientated activities, both in terms of facilitating smallholder entry into more formal chains by reducing costs to their participation and/or in enabling greater volumes of trade to occur in informal chains as a first step in encouraging their development and formalization.

While the region's trade deficit is increasing, there is substantial evidence that local producers enter local-level markets only to a limited extent as sellers of grain. Throughout the region, the proportion of maize producers who are actively selling maize into local markets is low and often there is a greater level of participation of producing households as *purchasers* than as *sellers* of maize. Barrett and Jayne et al. both provide statistics to substantiate the claim that rural households are predominantly net buyers of food staples. Even those households that do sell do not necessarily enter the market as sellers only. As Barrett states, of the 30 per cent of households that were net sellers in the harvest period, 62 per cent were net buyers two months later. Both chapters also point out that most sales are made by a small minority of better-resourced producers. These observations are supported by evidence from the commissioned case studies, provided in Box 14.2.

The level of smallholder participation, as well as determining the extent to which domestic producers can contribute to a lesser reliance on food imports, has significant implications in terms of the effect of price changes on households and the extent to which trade and price policies can play a role in pursuit of the objective of increased staple food productivity and production volumes in the region.

For example, while tariffs may provide an appropriate form of intervention in addressing the widespread market imperfections that are resulting in low levels of investment in food production and marketing, a common argument against their use is that they raise the price of the food staples, which negatively affects poor net consumers – a status which is generally argued to characterize the poor rural, as well as poor urban households.

Prior to the recent rapid increases in food prices in global markets and in many, particularly urban, markets in developing countries, the general perception has been one of a long-term decline in food prices. On average,

BOX 14.2 EVIDENCE FROM THE CASE STUDIES – LEVELS OF SMALLHOLDER PARTICIPATION

Common to all countries studied is the significant heterogeneity of household status with respect to maize production and sales.

In Kenya, the proportion of maize sold is relatively high at 46 per cent of total production. However, while 98 per cent of households cultivate maize, only 36 per cent sell the product, with 20 per cent of households accounting for the majority of sales.

In Zambia, about 80 per cent of farm households grow maize, but less than 30 per cent sell the product. Of the total sales, 40 to 45 per cent were from 5 per cent of farm households in the smallholder sector. These households tend to have incomes that are significantly higher and are located in areas more accessible to markets, than those households that do not sell.

In South Africa, 18,000 commercial farmers account for 90 per cent of grain production, with the remaining 10 per cent accounted for by 3 million smallholders.

The differentiation across households is likely to become more distinct as average landholding sizes continue to fall. In Malawi, smallholdings have been reduced in size from an average of 1 ha to less than 0.7 ha over the past 30 years. In an 'average' year, only 20 per cent of maize production is marketed.

Source: Case study Chapters 9–13, this volume.

both across and within countries, aggregate statistics support this observation. However, as evidence from the case studies suggests, the patterns differ across and within countries when disaggregated data are considered (see Box 14.3).

Determinants of Intervention – the Food Price Dilemma

The food price dilemma[1] occurs when there is simultaneous pressure on governments to improve producer incentives and to maintain low consumer

BOX 14.3 EVIDENCE FROM THE CASE STUDIES – TRENDS IN MAIZE PRICES

In Tanzania, during the control period in the mid-1980s and early 1990s, a system of government fixed, or announced, indicative prices resulted in limited changes to producer prices in nominal terms. However, the real retail price has fallen since the 1980s, while the real wholesale price has remained relatively constant. In the post-liberalization period, the trend continued, but with greater month-to-month changes in both the wholesale and retail prices.

In Zambia, real meal prices had fallen by 35 per cent 10 years into the reform process. In large part this was a result of a fall in milling to retail level margins of 50 per cent which is explained as resulting from a more competitive market structure, with (i) greater competition in both milling and retailing, (ii) an increased range of maize meal products (small millers tend to produce less expensive products) and (iii) cheap food substitutes such as wheat and rice from subsidizing or competitive exporting countries. However, the case study argues that the downward pressure on milling to retail margins only occurs if enough grain is available to the small millers, noting that when government intervenes, this can disrupt supplies and put upward pressure on prices. Similar to Tanzania, the wholesale price has remained relatively constant, but significantly more volatile.

Of the case study countries, maize prices tend to be highest in Kenya. Here the role of the National Cereals and Produce Board (NCPB) is significant with its activities estimated to have increased maize prices by 17 to 20 per cent because cumulative purchases were 30 per cent higher than sales over the period of analysis. As NCPB purchases have declined, so have real prices, which were about 30 per cent lower in 1995–2004 than in 1985–94.

During the control period in South Africa, prices at all levels were increasing. However, following the removal of price controls, both producer and wholesale prices fell (with monthly declines of 0.21 and 0.09 per cent, respectively), although retail maize meal prices increased by 0.11 per cent per month. Producer prices and wholesale prices both became more volatile, with the coefficient of variation for producer prices increasing from 9.8 to 35.2 per cent.

Source: Case study Chapters 9–13, this volume.

prices. It raises a series of questions as to whether seeking to increase levels of staples productivity via interventions to protect and increase the effectiveness of domestic staples markets (raising producer prices), is a better way to bring down real food staples prices in the longer run, than simply opening these markets to more competitive imports which can provide a cheaper source of food for growing numbers of consumers, but which in turn may disrupt efforts to develop domestic production.

To answer such questions, the differences between short- and longer-term effects need to be investigated to determine the extent to which the multiplier effects of increased local prices and production volumes outweigh the foregone short-term benefits from cheaper imported food. For example, if the prices of food staples increase, would current net-consuming farm households really suffer from higher prices in the longer term if they are able to switch to a net-seller status, and/or if the demand for their labour resources increases? On the other hand, does a lower producer price really translate to a lesser incentive to produce, or is it the case that price stability matters more than the absolute price level?

Given the limited market participation alluded to above, it follows that price or trade policy could be an ineffective instrument in improving production incentives for many rural households that are not participating to any significant extent as sellers of maize. Compounding this, many producers are effectively isolated from regional or international markets as a result of weakly integrated markets. In such cases, price or trade policy will have no effect, and as Barrett (this volume) suggests, impacts related to relative changes in border prices will not be noticeable even under full trade liberalization.

The extent of margins characterizing marketing chains where such problems are prevalent is addressed by Conforti and Sarris (ch. 5, this volume) who argue that the key to maize sector development is to reduce marketing margins. They use a CGE model of Tanzania to compare the impacts of reductions in marketing margins with the impacts associated with trade liberalization under a range of closure rule scenarios. They find that the positive impacts of reducing margins far outweigh those of trade liberalization, the latter of which can also result in reduced government revenues.

On the basis of observations from the case studies, it should also be noted that national average wholesale to retail margins might not reflect the true picture if spatial factors are not accounted for. For example, in Malawi, large spatial differences in maize prices are observed. While market integration improved after price liberalization, spatial market integration remained weak and price transmission between domestic markets is poor. This is explained as being due to poor transport, limited access to information and the micro nature of traders who have the ability to act as effective monopsonists in more remote markets.

Determinants of Intervention – Constraints to Supply Response

Another component related to decisions as to how to intervene in grain markets is whether smallholders who could potentially participate in better-integrated markets can respond to changes in price incentives or whether complementary investments in public goods are first needed to allow a significant supply response.

Jayne et al. note a number of reasons why the supply response of grain-producing households may be constrained. Key is the structure of smallholder agriculture, which has a significant impact in constraining supply elasticities. This structure is changing, with land/labour ratios declining, in a way that could further lower smallholder producers' capacity to respond to higher prices. With current land patterns, there is a high concentration of marketed maize among a small number of households (in some countries, 2 per cent of households supply 50 per cent of the total volume of marketed maize) and other smallholders are not making the investments needed to generate surpluses on even moderately sized 3 to 4 hectare holdings.

Compounding the difficulty of eliciting supply responses through investment by producers who are not well connected to markets is the observation by a number of researchers of the existence of low-level equilibrium poverty traps (Dorward et al. 2005; Barrett, this volume). Dorward et al. argue that rural economies are often trapped in low-level equilibria resulting in large part from a lack of coordinated investment along supply chains. A vicious cycle of low market volumes resulting in marginal private costs exceeding marginal social costs for actors at different levels in the chain, leading to underinvestment both by producers and by traders/processors along the marketing chain has been observed to trap sets of producers in low-level equilibria. In a similar vein, Barrett suggests that multiple equilibria can arise due to fixed and sunk costs involved with investment, coordination problems that arise in cases of public good provision, and liquidity constraints that hamper both households and governments.

The Role of the State – Promoting or Hindering Market Development?

Swinnen et al. (ch. 4, this volume) provide a historical perspective of supply chain governance in food staples, explaining that state-controlled governance systems are still most prevalent in supply chains of staple foods and that private traders that have emerged in this sector generally have limited capacity for innovation, poor access to credit and limited ability to interlink input and output markets.They argue that the way in which economic activities are conducted in the context of market imperfections and weak enforcement institutions determines how economic surpluses are generated and distributed along the chain and that governance is a function of value, such that an increase in the value in the chain will open the option for stronger contracts and better enforcement mechanisms.

The vacuum left as a result of the 'withdrawal' of the state from the support of market and non-market institutions for both the provision of inputs and for ensuring output opportunities, has been identified as a contributing factor to the poor production and trade performance of the grains sector in many Eastern and Southern African countries.

However, there is disagreement as to whether the difficulties in filling this vacuum relate more to the inability of the private sector to deliver services effectively, because of the pervasiveness of market failures, or to the fact that the state remains too engaged in staples marketing systems and that it is the consequent disruption and uncertainty related to this engagement that is preventing greater private sector activity and investment in informal marketing systems (see Jayne et al., this volume).

In the maize sector of many Eastern and Southern African countries, state involvement in purchasing, sales and trade is still significant (see Box 14.4).

How to Target Interventions

Challenges apparent in the observations related to smallholder participation, to weakly integrated markets, to constrained supply response and to the changing role of government developed above are:

1. How far is it necessary, and indeed possible, to increase smallholders' participation in markets as sellers so they can generate cash surpluses, given current resource constraints?

BOX 14.4 EVIDENCE FROM THE CASE STUDIES – GOVERNMENT PURCHASES AND SALES

Both the extent to which governments intervene, and the impact of these interventions, varies widely across the case-study countries.

In Zambia, the role of the Food Reserve Agency in maize marketing has grown significantly since 2002. In 2006 it purchased in excess of 80 per cent of national marketed maize from the smallholder sector. It was also involved in arranging maize imports and subsidizing maize price to large millers. As such, it has control over most of the marketed maize in the country, with 600 buying depots to buy at pan-territorial prices. The objective is to increase incentives for production and to promote self-sufficiency in the country. Financing this objective has been made possible through the use of Direct Budget Support and debt cancellation.

From 1995/96, the Kenyan government reduced the NCPB's operating budget. Purchases fell from between 3 and 8 million bags to 1 million bags per year. This volume increased again from 2000/01 trending up to 3 million bags per year (25–35 per cent of total maize sold). Most maize is purchased directly from large-scale farms in surplus areas to keep unit procurement costs low, but not necessarily benefiting small-scale producers in remote areas to the same extent.

In Malawi, the delinking of ADMARC from grain milling means that the sharp reduction in the number of marketing units operated by ADMARC, its weak financial position which imply that markets open late, and the fact that it runs out of funds before purchasing activities are completed, have led many to suggest that it is in fact an impediment to private trade. ADMARC purchases have fallen from 602,800 tonnes in 1991 to 129 tonnes in 2001, with sales down from 340,170 tonnes in 1990 to 51,460 tonnes in 2001. The parastatal can, however, still play an important role in selling maize to deficit households.

In Tanzania, the Strategic Grain Reserve competes aggressively with local traders when buying from farmers and the government also determines whether and how much to import and export. The SGR is therefore a key player in the market, although its activities are a function of the finance from the treasury. Its role in increasing maize demand is seen as a positive intervention as it supports producer price and increases market competition especially in more remote areas. However, the release of stocks during the off-season can reduce returns for stockholders.

In contrast to the four cases above, in South Africa, the marketing board was dismantled in 1997 and the government now plays no role in purchase or sale.

Source: Case study Chapters 9–13, this volume.

2. To what extent can changes in trade or price policy stimulate a supply response, with or without an increase in participation in more developed supply chains?

Larger producers, who are also generally better connected to regional and international markets, are in a position to respond to improved price incentives and reductions in input market failures. However, a majority of smallholders are not, as they lack access to remunerative markets and/or have inadequate productive capacity. Whether improved productivity levels in the small subset of better-endowed and -connected producers would provide a sufficient stimulus to increase the demand for, and returns to, labour of the wider rural population, or whether a larger set of smaller producers need to be assisted in increasing productivity and in participating as sellers in markets, remains an empirical question.

3 WHAT ARE THE POLICY ALTERNATIVES? SOME INSIGHTS FROM THEORY

If it is widely agreed that productivity levels in grain staples in ESA need to increase and that widespread market failures, in limiting market participation and supply response, are acting to constrain increases in productivity, there has been little consensus on the appropriate types of policy intervention.

Recognizing that interventions to alleviate the effect of market failures are required does not answer the question as to what is the optimal policy intervention to address divergences between marginal private and social costs, and perhaps more importantly, at what level of the supply chain the interventions should be made. The answers to such questions will undoubtedly be context specific, depending upon both the extent of imperfections in credit, input, output and labour markets, and the characteristics of the staples food production and marketing system. However, some insights may be generated from consideration of both theoretical and empirically based arguments.

A Hierarchy of Interventions

A number of interrelated arguments have been drawn upon by both sides of the debate as to whether intervention through trade policy provides an appropriate way of promoting agriculture's contribution to food security and economic growth via improvements in food staples productivity, or whether such policies actually suppress growth and poverty reduction efforts both through their impact on food prices and by constraining appropriate resource reallocation.

Such arguments relate to issues such as optimal tariff (tax) policy, the infant industry argument, the unpredictability of policy interventions, the relationship between tariffs and food prices, the relationship between food staples prices and the production and consumption behaviour of poor households.

A starting point often taken is that market failure rarely justifies trade restrictions (Masters, 2007) and therefore that failures in domestic markets and trade policy are essentially unrelated. Masters contends that second-best policies may be optimal where first-best policies are constrained, but stresses that as they do not solve the root problem, the optimal second-best intervention is likely to be small. However, he does acknowledge that where trade taxes play a significant role in the generation of government revenue, the optimal trade policy intervention could be greater.

Such insights draw on Corden (1997), who demonstrates that under generally assumed conditions, there is a hierarchy of interventions associated with a distortion in a factor market that is causing marginal private costs to exceed marginal social costs. In this hierarchy, a direct subsidy to the factor such as labour or credit, ranks higher than a direct subsidy to the sector in terms of a subsidized product price. This in turn is preferred to a combination of tariff and export subsidy, which is itself preferred to imposing a tariff alone. The tariff ranks fourth best in this example because of its suppressing effect on factor use intensity, the fact that it creates a consumption distortion and that it creates a bias towards production for the domestic market. Corden argues that going down the *hierarchy of policy interventions* requires justification. In particular, where an intervention is to address a marginal divergence, the form of intervention needs to balance the benefit of higher output with any potential consumption costs.

Corden concedes, however, that where subsidy disbursement costs are allowed for, *the ranking can change.* In many rural economies, it is costly to intervene at the point of marginal divergence, whereas tariffs have no disbursement costs and may therefore become first best. This argument is reiterated by Buffie (ch. 2, this volume) who cites the principle of targeting whereby a first-best policy would maintain free trade and subsidize or tax at source if, and only if, this does not involve high administrative costs.

Dynamic Effects

Clearly, in situations of low-productivity staples production systems characterized by many poorly integrated producers, the costs of input subsidy disbursement can be high. Although the trade-off between such costs and improvements in allocative efficiency cannot be determined a priori, theoretical insights can clarify aspects of the debate. For example, it can be demonstrated that while there are no consumption costs associated with a direct subsidy, this subsidy needs to be paid for through revenue generation and that this can involve distortive costs. It can also be demonstrated that tariffs are less efficient the more elastic the import demand, and the larger the cost share of non-labour inputs (Buffie, this volume).

One area of the theoretical literature often referred to in contemporary debates may provide a useful stating point for considering the extent to which trade policy may be relevant. The infant industry argument (IIA) essentially claims that certain sectors, if 'protected' can grow and that in the long term, the benefits associated with a more competitive sector outweigh the costs of the initial intervention. Bardhan (2007) notes that IIAs are based on dynamic economies of scale and learning externalities.

Drawing on the infant industry literature, the case for intervention in staple food markets might be made in terms of both dynamic *external* economy and dynamic *internal* economy arguments. A summary example of the dynamic external economies argument could be a case in which traders or processors invest in the marketing system, resulting, as a side-effect, in lower transaction costs for primary producers. Producers facing a more stable investment environment, invest more, raising their marketed surplus, in turn leading to falling unit costs for the traders and processors. However, such examples rarely occur spontaneously and intervention may be required to kick start this cycle of coordinated investment.

Dynamic internal economies may exist in a situation in which an uncompetitive firm can be supported during the process of learning, for example, in developing its competitive status through investment in productivity-enhancing technical change. There may be no case for intervention if finance is freely available and the firm can borrow required funds with a view to recouping investments and paying off the loan when revenue flows increase. However, in situations of market failure such as imperfect information and/or imperfect capital market, intervention may be required to support such an investment.

According to Buffie, the classic IIA asserts that firms become more efficient as they become more experienced. During the infancy or learning phase, firms suffer losses when competing at prices dictated by free trade, but as they develop, they can compete profitably without protection. When imperfections exist in financial markets, firms may not be able to borrow to cover temporary losses during the learning phase. The principle of targeting suggests that governments should lend directly to infant industries or provide loan guarantees for targeted firms that would otherwise not receive credit from commercial banks.

Picking up on the idea of subsidy disbursement costs, a case for tariff protection rather than direct subsidization might be made. For example, if seasonal credit markets do not operate efficiently as a result of adverse selection problems, then it could be argued that intervention at the source of distortion for example, by granting a loan, is more 'costly' than a temporary tariff, lifted once the sector has graduated, and that in such a case, tariff intervention may provide an appropriate instrument of intervention.

Buffie suggests that in combination, underemployment and underinvestment argue for an escalated structure of protection and export promotion that lowers the real price of imported capital goods and intermediate inputs. He also notes that an escalated structure of protection *plus* export promotion does not necessarily imply that the economy is less open or that there is less trade than under free trade. The policy package alters the composition of trade with fewer imports of consumer goods, but with more exports and more imports of intermediate inputs and capital goods.

4 WHAT HAVE COUNTRIES DONE IN PRACTICE?

The theoretical insights briefly discussed above suggest that appropriate trade and domestic policy interventions are likely to differ on a case-by-case basis. While subsidy disbursement may be used to offset market failures in one context, a temporary tariff protection may be a more realistic support instrument in others, particularly where financial and administrative structures are stretched. But what have countries done in practice? In this section, the pros and cons of different interventions elaborated in the five case studies are discussed.

Reforms in South Africa have perhaps been the most far-reaching. The reforms have successfully managed to achieve the goal of a market-orientated system while opening the sector under Black Economic Empowerment. However, the industry has not been able to achieve increased levels of competitiveness and profitability on the basis of the reforms. Indeed, there are very few intervention mechanisms remaining to allow support to either the informal chains or to the newly emerging commercial sectors. Very low rates of duty are applied – zero on maize seed and 5 per cent on milled products, with Producer Subsidy Equivalent for maize of 7.6 per cent, meaning that there is effectively no protection of these nascent sectors to assist in the development of their competitiveness and profitability. While the significant lack of investment in the informal small-scale milling may be blamed in part on the high degree of concentration in the milling and retail industries, levels of government investment in and support of the sectors are probably too low (Traub and Meyer, ch. 11 this volume).

In Kenya, the case study concludes that the implementation of reforms has most likely exacerbated the risks and costs faced by the private sector, hindering investment. Frequent and unanticipated changes in tariffs, quantative restrictions, regulatory changes facing traders, and the behaviour of the NCPB all result in high levels of uncertainty being associated with government activities. It is noted that compliance with the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC) initiatives has stabilized the use of trade policy interventions to some extent, but that the non-tariff barriers in place continue to be very cumbersome. The authors suggest that the sector needs investments to make it more profitable and competitive. This is unlikely to happen in the absence of support, but the case study makes clear that any intervention needs to be more transparent. One option that Ariga and Jayne suggest is the use of a floor price, if set at a sufficiently low level (ch. 9, this volume).

Similarly, in Zambia, the government has remained a major player in both the maize and fertilizer markets, through extensive use of export bans, marketing board operations, and input subsidies. In contrast to other countries, import tariffs have risen from 5 per cent before 2004 to 15 per cent. But again, it is the unpredictability of these interventions that is causing most harm. Late and insufficient imports by the public sector following announcements that it will intervene, have stymied private incentives to import and frozen out all but a few selected millers. The authors point to a vicious cycle of government threat of entry and the resulting lack of private sector response as contributing to limited investment in transport, wholesaling, storage facilities and fertilizer importation. The problem is compounded by the fact that the potential sale of government-owned storage facilities at concessionary prices has further reduced the incentive for the private sector to invest in storage. As with the Kenyan case, the authors do not press for the elimination of government intervention (Govereh et al., this volume).

Perhaps more positive is the case of Tanzania. Here, the government sees its role in trade and marketing as being to strengthen competition by facilitating the promotion of increased quality, collection and dissemination of market information. However, food security concerns still influence policy interventions, and reversals to reform are often experienced after periods of crop failure and food insecurity. Despite this, the Strategic Grain Reserve is seen as a positive intervention, supporting prices especially in remote areas and increasing competition. At the same time, government interventions that disrupt trade flows are perceived as having a negative effect. Again, it is not so much due to the level of trade barriers, but the use of non-tariff instruments. Imports and exports are both subject to licensing. An exporter needs a time-bound permit (1 month) stipulating the quantity that can be exported and this can be costly to obtain in terms of their time. Similarly, for importers such barriers hinder potential grain traders from engaging in this business and create an incentive for illegal cross-border trade (Temu, Manyama and Temu, ch. 12, this volume).

In Malawi, perhaps more than in the other countries, food security concerns dominate maize sector interventions. The case study notes that an unstated policy objective is to minimize importation of maize and to avoid 'begging' maize from other countries. Trade restrictions are frequently imposed to ensure an adequate supply of maize on domestic markets. Importation is normally undertaken by government through a tendering process in which the private sector is subcontracted to import maize when domestic shortfalls are expected. When this maize enters the country, it is distributed at subsidized prices. This makes it very difficult for traders to import large quantities and to find markets at commercial rates. Similarly to other countries, the level of the tariff is not really an issue in terms of modifying trade flows. Maize grain enters tax free in the tariff schedule, while maize meal faces a tariff of only 10–15 per cent if imported from outside COMESA. There are quality requirements, but sanitary and phytosanitary measures do not appear to impede trade. In a similar vein, exports are subject to restrictions and intermittent bans. Even when bans are not in place, licences to export are needed and these are not readily issued. This situation results in a highly unpredictable trading environment in which informal trade thrives. Again, this case study does not call for a complete liberalization of trade. Rather it suggests that government should eliminate export bans but still regulate through licensing to ensure that food security concerns are met. The proper application of licensing could be improved by better forecasting of deficits and collaboration and trust building between the public and private sectors (Chirwa, ch. 10, this volume).

5 THE PRACTICALITIES OF TRADE POLICY INTERVENTION

The examples in the previous section demonstrate that trade and market policy is seen as integral to the support of food staples development. However, in light of the insights summarized in this chapter it is clear that there is no 'one size fits all' approach to trade policy design and implementation. The specific context in terms of the role of the sector in the wider economy, the extent to which smallholders participate as sellers in markets, and the functionality of these markets needs to be integrated into policy analyses.

While the theory and evidence set out in this volume may lend some support to the use and more predictable application of trade policies and some insights as to how trade policy might best be configured to promote longer-term development of the sector, the design of recent policy interventions has clearly been driven more by the practicalities of intervention, essentially to meet short-term interests. No matter what the insights from theoretical or empirical investigation, there are a number of categories of practical factors that will continue to make intervention through trade policy problematic.

Among the key constraints to the adoption of the most appropriate policy from an agricultural development perspective, is the political economy of decision making. Indeed, many commentators acknowledge that political economy arguments can shed more light on actual policy decisions than can economic theory and generally provide a richer explanation than the market failure story.

Examples of incidences from the case studies where political economy considerations were considered to be paramount include:

1. Frequent government pronouncements that change the trading environment, increasing its unpredictability.
2. The over-riding short-term food security concerns when it comes to food staples market intervention. In Malawi, for example, where 94

per cent of the population have maize as their main food, there is a perception that food-security crises can be precipitated as a result of lifting export bans.

3. The role of donors. To a certain extent, Direct Budget Support has been a factor in the increased activity of marketing boards which are becoming dominant players again in Kenya, Malawi, Zambia and Zimbabwe.

On the basis of the case studies and the other chapters in this volume, three considerations in trade policy design and dialogue appear to be of central importance:

1. *Reducing the unpredictability of government interventions* Arguments against trade policy interventions often cite the unpredictability of the use of trade policy rather than the level at which it is applied as being the key issue. Uncertainty exists over the implementation of export bans and import quotas, over unannounced changes in the levels of import tariffs and over knowing when marketing boards will enter the market and at what price they will sell and/or buy.

   For example, given the unpredictability of government behaviour with respect to trade policy, and the constant risk of subsidized public maize sales, private traders and millers have been reluctant to engage in commercial maize imports in Zambia. Since market liberalization began in 1991, five internal grain companies opened trading offices in Zambia, but four have since closed because of the high risk of loss associated with unpredictability in policy interventions (Dorosh, Dradri and Haggblade, ch. 8, this volume).

   Traders have difficulty in anticipating what governments will do. In the first half of 2007, the Zambian government's position on maize exports changed three times. In deficit years, when maize imports may be subsidized by governments, traders are reluctant to bring in grain because they may have to sell it at a loss. This results in traders limiting their exposure by importing small volumes. The government's response is to import more significant amounts to fill potential gaps. Where supply gaps still exist, food aid often plays a role. The interaction of private sector, government, food aid agencies is complicated by misjudgement and mistrust which can lead to over-reactions, resulting in increased volatility in food availability and in food prices (Dorosh et al.).

   However, opening product markets to international competition without doing anything about weak or distorted factor markets is likely to be a suboptimal approach. Product market liberalization will not necessarily improve welfare if input market imperfections remain unaddressed.

2. *Reconciling trade policy use with domestic policy processes* The debate as to the relative merits of alternative interventions generally misses important aspects of complementarities between trade and domestic policy interventions. Policy interventions should not be seen as an either/or choice between domestic or trade policy. In many countries however, processes are not in place for different stakeholder interests to be fully articulated in the development of policy responses, not least between agricultural and trade ministries, let alone government and private sector actors.
3. *Looking outside national borders* Often research related to grain marketing systems is undertaken within the country boundary. However, significant levels of trade occur between different regions of a country, and frequently surplus production in one area of a net-importing country serving deficit areas in neighbouring countries. For example, southern Mozambique finds it most economical to import from South Africa to serve deficit areas, while northern Mozambique provides exports to Malawi and Zimbabwe. Equally, maize is tradable in some areas of certain countries, but not in others. These spatial patterns have important implications for price-setting processes and therefore for the effectiveness and impact of trade and price policies.

   The increase in the number and functionality of regional trade agreements will be important in determining the pattern and scope of intra-regional trade. A move to increased reliance on regional trade rather than national responses is likely to be optimal. This can be facilitated by coordinated warehouse receipt systems and commodity exchanges and building market information systems to help to build confidence in regional trade

6 CONCLUDING COMMENTS

This chapter has attempted to briefly distil and link some of the key insights from the preceding chapters in this volume. A number of suggested areas for further research and dialogue can be identified:

1. An improved understanding of the dynamic effects of price changes in the context of imperfect markets, on food staples productivity and labour demand is required to inform better formulation of policies that may directly or indirectly affect prices.

2. While there is evidence to support the claims of low levels of market participation, and of the existence of poverty traps, further research is urgently required to: (a) explain the variation in levels of market participation across and within countries, (b) determine how this static picture of low-level participation relates to the dynamic role of agriculture in the transformation of rural economies, and (c) determine the appropriate set of policy interventions in these different contexts.
3. There is a need to strengthen policy dialogue and the capacity of both the public and private sectors to analyse the implications of trade policy use, by drawing on theory and on insights from empirical analysis and by applying these insights to the specific context of low-productivity, imperfect markets where efficient resource reallocation in response to changes in incentives cannot be guaranteed. Policy analysts need to be especially cognisant of short-term food security objectives, which are often paramount, but which may be contrary to longer-term market development priorities.

Governments will continue to use trade policy to address multiple objectives. The task for analysts is to ensure that policy design is informed by the specific context and that maximum attention is given to increasing certainty and contributing to a positive investment environment.

NOTE

1. See FAO (2006) and Nash (2007) for a fuller discussion.

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