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Food Crises and Food Markets: Implications for Emergency Response in Southern Africa

by

David Tschirley and T.S. Jayne

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Department of Agricultural, Food and Resource Economics
Department of Economics
MICHIGAN STATE UNIVERSITY
East Lansing, Michigan 48824

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David Tschirley and T.S. Jayne

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Tschirley and Jayne are both Professor, International Development, Department of Agricultural, Food and Resource Economics, Michigan State University.

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EXECUTIVE SUMMARY

Concern about humanitarian crises in southern Africa, especially in light of the surge in world food prices since 2007, has been accompanied by calls for direct government action in food markets. This paper reviews how Zambia, Malawi, and Mozambique handled private food markets during the food crises of 2001/02, 2002/03, and 2005/06, which may provide important lessons for the management of future crises. Lack of trust between government and traders can lead to behavior that undermines the interests of each and harms consumers and farmers; Malawi and Zambia have persistently fallen into this trap while Mozambique has partially avoided it. Empirical policy analysis can make an important contribution to resolution only within a consultative process involving a broad range of (often fractious) stakeholders.

Key words: Southern Africa, Malawi, Mozambique, Zambia, markets, emergency response, trust

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ACRONYMS

ADMARC	Agricultural Development and Marketing Corporation
CIF	Cost, Insurance, Freight
FAO	Food and Agricultural Organization
FAOSTAT	Food and Agricultural Organization Online Statistical Database
FEWSNET	Famine Early Warning Systems Network
FRA	Food Reserve Agency
FSRP	Food Security Research Project
IAF	*Inquérito às Familias* (Household Budget and Expenditure Surveys)
INTERFAIS	International Food Aid Information System
IPP	import parity prices
ITU	International Telecommunications Union
NFRA	National Food Reserve Agency
NGOs	Non-governmental Organizations
RSA	Republic of South Africa
SADC	Southern African Development Community
SAFEX	South African Futures Exchange
SARPN	Southern African Regional Poverty Network
SIMA	S*istema de Informação de Mercados Agrícolas* (Agricultural Market Information System)
TIA	*Trabalho de Inquérito Agrícola* (Agricultural Household Surveys)
USAID	United States Agency for International Development
US$	U.S. Dollar
VAT	value added tax

I. INTRODUCTION

Southern Africa is an increasing focus of humanitarian concern, with identified crises in 2001/02, 2002/03, and 2005/06. Among emergency response agencies, non-governmental organizations (NGOs), and some academics, explanations for this trend have loosely coalesced around ideas such as the triple threat or new variant famine: HIV/AIDS, environmental stress (especially increasingly unreliable rainfall and declining soil fertility), and worsening governance have made more people more susceptible to destitution from what might have been manageable shocks in the past (Southern African Regional Poverty Network [SARPN] 2007; FAO 2007; Devereux 2002a; Devereux 2002b; Devereux 2006; Haddad and Frankenberger 2003; Frankenberger et al. 2003; Mano, Isaacson, and Dardel 2002).

Closely related to this explanation is the sense among some donors, operational agencies, researchers, and perhaps most strongly among many government officials, that food market liberalization has gone too far or too fast, that it has not delivered (and may not deliver for a long time) its promised benefits in productivity, efficiency, and income growth, and that a much more comprehensive set of safety nets – and renewed government action in cereals and input markets – is needed to jump start rural growth and reverse the increasing destitution of rural populations in the region.[1] Recent food policy in Zambia, and especially in Malawi, has been heavily informed by this resurgent market skepticism.

The world commodity price boom has led to even greater controls on food markets. Zambia and Tanzania have placed export bans on maize in the past 18 months, Mozambique banned the bicycle trade that formed the backbone of its informal exports to Malawi, and Malawi has announced a ban on all private trade in maize[2]. Yet regional trade in staple foods in southern Africa is likely to be more important in a high price environment, not less. Trade among countries other than South Africa in the region could be especially crucial, as South Africa's market is strongly linked to world markets while those of Zambia, Malawi, and Zimbabwe (and to a lesser extent Mozambique) are more insulated by transport costs and by their inability to export internationally due to deficient quality and contracting standards. Increased productivity and intra-regional trade will be crucial to the region's ability to cope with the new high price environment.

Market skepticism has grown despite what we argue to be demonstrably greater opportunities for markets to contribute to more stable food systems in the region. Current food crises occur in a policy environment far different from that of 15 years ago. Most governments have reduced their control over the maize sector since the early 1990s, even considering the recent uptick in direct government action in the region. A daily spot and futures price discovery mechanism is now available in the region in the form of South African Futures Exchange (SAFEX). Cell phone ownership has exploded and call rates have fallen, dramatically increasing the ability of market actors to exchange information[3]. Domestic production,

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[1] See Dorward et al (2004) for perhaps the most developed version of this argument. See also Dorward and Kydd (2004) and Devereux (2002b) for Malawi.

[2] The ban is to be effective 1 October 2008. Negotiations between government and traders were ongoing days prior to this date, and uncertainty prevails regarding the extent to which the ban will be implemented.

[3] Africa has the highest rate of growth of cell phone ownership in the world, growing from 15m in 2000 to 160m by end of 2006 (ITU, 2007). See also Aker (2008).

marketing, and consumption patterns have also changed in ways that should improve the ability of markets to respond to these droughts and reduce the region's dependence on external food aid.

This paper reviews how governments in the region have managed food emergencies, with a special focus on Zambia, Malawi, and Mozambique's handling of private food markets during the three food crises of this decade. The next two sections lay out our conceptual framework, data, and methods. We then review emerging trends and characteristics in the region's maize production and marketing systems before summarizing key aspects of each food crisis. Next, we assess each country's responses, looking for any substantial change over time in how markets were handled. We conclude with thoughts on how to make more effective use of markets in emergency response and on key research needed to better inform such response.

II. CONCEPTUAL FRAMEWORK

Our conceptual framework is based on the following features, each of which we explain in more detail below: i) Government and traders interact in the same political and economic space but with differing objective functions; ii) the two are dependent on each other in that the behavior of each affects the outcome of the other; iii) information about the other's behavior is imperfect, and the effects of some behavior are seen only with a time lag; iv) as a result, each must base their own behavior in part on expectations about the behavior of the other; v) because expectations matter, trust matters; a breakdown in trust can lead to a social trap in which behavior by each undermines the interests of both; vi) trust between government and the trading sector is difficult to develop because of differing objectives, values, and world views; vii) empirical analysis is necessary to resolve the problem, but can contribute to a resolution only to the extent that it is embedded in a broad consultative process that develops a shared understanding of the problem; and viii) building such understanding takes time and is never accomplished in any final sense; on-going interaction among interested parties is crucial.

In the context of this paper, government's objective is to ensure adequate supplies of staple foods throughout the country at prices accessible to the poor, regardless of the country's production outcome. Traders' objective is to maximize profits over some time horizon. Traders' profits are clearly affected by government policies and practices. For example, sudden imposition of trade restrictions, or direct government importation of food and targeted sales to selected buyers at subsidized rates, can dramatically affect a trader's bottom line for good or bad, depending on their market position in relation to the government action.[4] Likewise, traders' ability to engage in non-competitive behavior can negatively influence the achievement of government's objective of broad and affordable access to food.

Government and traders cannot be certain what the other will do, so each must base their behavior in part on expectations regarding the likely behavior of the other. For example, government may indicate that it will import a certain quantity of grain within a specified time period; but even in the absence of mistrust, the complexity of decision making means that traders cannot be certain that government will actually do this. Nor can traders be certain of who will be allowed to buy the grain from government if and when it does import, or at which price. These unknowns are major sources of risk and potential financial loss for traders. For its part, government cannot be sure that traders will import sufficient food during a crisis to assure broad access at politically acceptable prices. In fact, because demand for food staples is price-inelastic, governments know that trader profits will be increased in the short-run by restricting supply, and so are sensitive to the possibility that traders may collude to do this.

These differing objectives leave government with two choices: assure food supply and distribution itself, or delegate the task to traders as a collective, i.e., to the market.[5] Due to the price inelasticity of demand for staples, government will choose the second option only if

[4] For example, a trader sitting on large stocks of maize when an export ban is imposed could lose large sums of money, while another without stocks but with a contract to supply maize to an institutional buyer could earn much higher profits than in the absence of the export ban.

[5] See Falcone and Castelfranchi (2002) for concepts of delegation and of trust as a three-party relationship.

it believes the market can impose the needed discipline on individual traders so that their profit seeking actions also result in government achieving its goal.

Several factors stand in the way of such a choice. First, markets may not be fully integrated and competitive and so may not provide this discipline[6]. The answer to the central question how long an initially localized scarcity will persist depends on how well the region is connected to other regions (Ravallion 1986). As shown by the review below, research on maize market integration and spatial efficiency in the post-food market reform period provides a consistent empirical foundation in southern Africa, yet this empirical foundation has seldom guided policy decisions in the region.[7]

Second, high transport costs in African markets mean that, even if markets are competitive, final costs to consumers during national production shortfalls can be high. Finally, government officials with little or no personal experience operating in a competitive market setting may have little appreciation for how such a market can convert individual profit seeking into socially beneficial outcomes. This understanding is further hindered by the differing beliefs, values, and world views that broadly characterize the government and trading sectors in the region. The trade problem, especially during a food crisis, thus takes on elements of a "*wicked problem*", in which "core beliefs are at stake, competing sides … defend their … belief systems and attack" those of others, and the problem "(resists) resolution by appeal to the facts" (McBeth et al. 2007; see also Conklin 2006).

The result of this dynamic is that governments often prefer to take an active and direct role assuring adequate food supplies. Yet in no country of the region is government capable of handling this challenge on its own. It thus enlists the private sector but attempts to control its behavior through some mix of import/export permits, targeted delivery of and subsidies on government imports, direct public distribution, and use of the political bully pulpit regarding the amount of food that the private sector should import.

This hybrid approach highlights the fact that, though traders' and processors' objectives may be antithetical to those of government in the short-run, the former are in a multi-period game with government, need to recover fixed costs over time, and so have some incentive to collaborate. This is especially true since traders know that governments can and often have taken restricted traders' activities and limited their ability to recoup their investments[8]. Yet the hybrid approach means that the same lack of trust that led to government's involvement can lead to behavior that undermines the interests of both parties. Key among these is *in*action by the private sector: because many firms are motivated more by fear of loss than by

[6] This may be especially true of markets for large-scale food imports, which require substantial financial and physical (e.g., transport, storage) capital. Informal markets may be more competitive, but are by definition smaller in scale, have more limited geographical scope, and thus may not by themselves be able to respond adequately to a large national shortfall.

[7] See Del Ninno, Dorosh, and Subbarrao (2004) for discussion of how government confidence in a competitive import response in Bangladesh led to much more open policy stance compared to Madagascar, where government was not confident of such a response.

[8] The recently announced ban on private maize trade in Malawi is only the most extreme reflection of this fact.

desire for gain,[9] uncertainty regarding government behavior may lead to private sector not importing even when current or anticipated domestic prices suggest that they should. As a result, government and consumers are harmed by skyrocketing food prices, the private sector foregoes current profits, and both miss an opportunity to build a competitive commercial trading network that could serve everyone's interests during future production shortfalls.

[9] Regarding the concept of loss aversion, in which "the disutility of giving up an object is greater than the utility associated with acquiring it," see Kahneman, Knetsch, and Thaler (1991).

III. DATA AND METHODS

We use an assortment of data in the paper. National maize production comes from Food and Agricultural Organization Online Statistical Database (FAOSTAT). Prices from Mozambique, Malawi, and Zambia come from the national market information systems in these countries, while South African prices come from SAFEX.[10] Data on household production, marketing, and consumption patterns come from various household surveys: Mozambique's 2002 *Inquérito às Familias* (IAF) and 2002 and 2005 *Trabalho de Inquérito Agrícola* (TIA), and Zambia's Central Statistical Office/Michigan State University 2001 and 2004 Supplemental Post-Harvest Surveys of rural farm households, and their 2007/08 Urban Consumption Survey. Information characterizing the various food emergencies and assessing country response came from a review of Famine Early Warning Systems Network (FEWSNET) and Southern African Development Community (SADC) early warning bulletins and key informant interviews.

Our quantitative benchmark for assessing the effectiveness of response to each food crisis was a comparison of local wholesale prices in each country to import parity prices (IPP); efficient trade should prevent local prices from exceeding IPP for any sustained period of time. IPP was based on SAFEX Randfontein cash prices plus costs of transport to the capital city of each country. Data for Zambia come from a transport cost series developed by Michigan State University's Food Security Research Project in Zambia in consultation with the Road Hauliers Association. Data for Mozambique came from cost build-ups developed through trader interviews in 2005 and 2006. Lacking specific data for Malawi, we use transfer costs to Zambia.

[10] In Mozambique, data is from SIMA in Ministry of Agriculture. For SAFEX, we use the Randfontein cash price, which is the current price of a futures contract expiring no more than one month out.

IV. CHARACTERISTICS AND TRENDS IN REGIONAL MAIZE PRODUCTION AND MARKETING SYSTEMS

A review of literature and survey data from southern Africa highlights six trends with important implications for emergency response strategies: (i) more diverse staple food production and consumption patterns; (ii) a decline in maize marketing costs and improvement in spatial market efficiency; (iii) reduced instability in regional maize production; (iv) less positively co-variant maize production among countries in the region; (v) no trend in inflation-adjusted maize prices at least up to early 2007, with post 2007 prices rising beyond historical averages in US dollar terms but not necessarily in real local currency terms; and (vi) rising informal cross-border maize trade.

4.1. More Diverse Production and Consumption Patterns

The reduced subsidy to and control of maize systems that began in the early 1990s has led to more diversified production and consumption patterns. Production in more isolated or agro-ecologically less advantaged areas has begun to diversify away from maize, with cassava especially filling the gap. In Zambia, for example, maize production has trended negative since the late 1980s, while cassava production has doubled (Chitundu, Droppelmann, and Haggblade 2006). Cassava production has also grown rapidly in Malawi, and has always been an important staple in the most heavily populated rural areas of Mozambique.

Consumer expenditure is diversifying away from maize (Table 1). In rural areas of the three provinces of southern Mozambique, for example, rice and wheat have a higher combined expenditure share than maize (about 15% vs. 11%; Tschirley and Abdula 2007). In the capital city of Maputo, maize's share is only 2.4%, compared to a nearly 25% combined share for wheat and rice. Wheat's expenditure share exceeds that of maize in Zambia's two largest cities. While maize's expenditure share is certainly higher in rural areas, the direction of change is likely to be the same, towards greater diversity in consumption habits.

Table 1. Percentage of Total Food Expenditure Allocated to Food Items in Selected Areas of Mozambique and Zambia

Food Items		Mozambique			Zambia			
		Maputo Province	Gaza and Inhambane Provinces	Manica and Tete Provinces	Lusaka	Kitwe	Kasama	Mansa
Urban	Maize	2.4	14.5	39.9	8.9	10.6	9.8	11.5
	Rice	7.8	9.8	4.4	2.5	2.8	3.4	2.7
	Wheat	15.5	6.0	2.9	11.8	11.3	6.2	7.3
	Cassava	1.3	5.2	0.5	0.3	0.8	2.0	4.1
Rural	Maize	9.1	12.2	48.0	----	----	----	----
	Rice	11.4	9.5	2.5	----	----	----	----
	Wheat	7.4	3.2	1.4	----	----	----	----
	Cassava	4.7	8.4	0.5	----	----	----	----

Data Source: Mozambique: 2002 *Inquerito as Familias*, according to IAF 2002, according to their definition of rural and urban; Zambia: 2007 CSO/MSU Urban Consumption Survey, first round, as calculated by authors.

4.2. Increased Spatial Market Integration and Lower Marketing Costs

Spatial market integration studies for maize in Malawi, Mozambique, Zambia (Goletti and Babu 1994; Chirwa 1999; Tostau and Brorsen 2005; Loy and Wichern 2000; Awudu 2007) and the broader region (Rashid 2004; van Campenhout 2008) are broadly consistent in their conclusions: maize markets are reasonably well integrated, are becoming more efficient over time, and marketing costs are declining. Some of the studies attribute increased market efficiency to liberalization. Others note that some markets continue to be poorly integrated mainly due to high transport costs and government activities in the maize market, particularly in Malawi. In fact, most of these studies are likely to understate true spatial market efficiency because of the difficulty of accounting for *ad hoc* government operations and suddenly announced trade bans and changes in tariff rates, all of which introduce differential spatial price shocks in local markets.

Real retail maize meal prices and marketing margins between maize grain and maize meal have fallen substantially in Zambia since reform (Jayne and Chapoto 2006): from 1994 through 2005, trend maize meal prices fell about 30% from 1994 through 2005 while marketing margins fell by roughly 50%.[11] These declines are driven by the informal maize processing and trading systems that arose after reform, which have proven less costly than the industrial milling sector and which compete effectively against it for low- and middle income consumers.

Over the same period, real margins have increased in southern Mozambique and South Africa (about a 50% rise in margins in each country). In both countries, the rising margins appear related to highly concentrated maize milling sectors and to regulatory barriers that limit the availability of grain for milling in hammer mills during the hungry season (Tschirley and Abdula 2007, Traub and Jayne 2008).

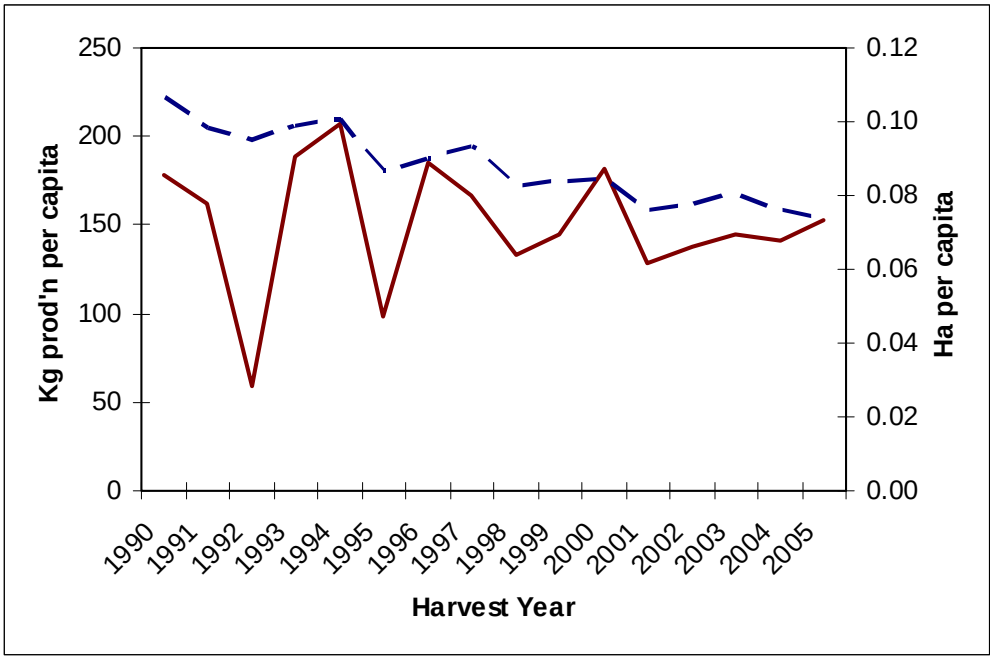
4.3. Steady Per capita Production

Official per capita maize production in the region has shown no trend since 1990, despite clear declines in per capita area harvested (Figure 1, p. 9). More surprisingly, aside from Zimbabwe, per capita maize production has unambiguously declined only in Zambia, and there, the decline has been largely offset by increased cassava and wheat production (Chitundu, Droppelmann, and Haggblade 2006). Malawi's per capita maize production increased roughly 1.5% per year from 1990 through 2005.[12] One of the perceived threats in the triple threat explanation of the region's food crises is food insecurity due to declining soil fertility and other farm-related environmental degradation (SARPN 2007; FAO 2007); recently, climate change has been added as a key concern. These production trends suggest the need to examine more closely the empirical basis for the environmental concerns embodied in the triple threat.

[11] Though not considered in this review, reform has had similar impacts in Kenya.

[12] This computed per capita growth rate excludes 2006 and 2007, due to widespread doubts about extremely high official production figures for these years.

Figure 1. Per capita Area Planted and Production of Maize in Southern Africa, 1990-2005



4.4. Less Covariant Production across Countries

Production in the region is widely seen as highly covariant across countries. Yet production has been far less covariant over the past decade (Table 2, p. 10). From 1990 to 1999, correlation coefficients on maize production between South Africa, Zimbabwe, and Zambia were large, positive, and highly statistically significant; from 1996 to 2005 they were much lower and none were significant. Correlations between those three countries and Mozambique and Malawi were small and insignificant during both periods[13]. Mozambique's lack of correlation with other countries is driven by the predominance of the North in national production, and by the low correlation of weather patterns in this area with those in the rest of the region.

4.5. Steady Real Maize Prices

Maize price data are much less affected than production data by concerns about data quality, and they reinforce the per capita production story: nominal US$ prices in the region through 2007 show no appreciable trend since 1994. Furthermore, emerging evidence shows that, in real local currency terms, maize prices fell sharply in Zambia between 1994 and 2007, showed no trend in Mozambique, and rose in Malawi (Jayne et al. forthcoming). In all three cases, the large 2007/08 run-up in world prices denominated in US$ appears much less severe when food prices are expressed in real local currency terms. Because of exchange rate depreciation of the US dollar compared to local currencies in Zambia, real 2008 maize prices

[13] The negative correlation between Mozambique and Zimbabwe is a special case, driven by the economic turmoil in Zimbabwe contrasted with recovery from the civil war in Mozambique.

are below their 15-year historical mean when expressed in local currency units. These price trends suggest that, if access to food is more difficult for more people in the late 2000s than it was in the early 1990s, it must be due to declining incomes among sub-populations in the region; on an aggregate level, production and prices both suggest steady or increasing per capita food supplies over the period.

4.6. Rising Informal Border Trade

This trade has become a regular feature of the region's maize economy since market reform in the 1990s. Trade between northern Mozambique and Malawi is well known; less appreciated is that between Tanzania, Malawi, Zambia, Zimbabwe, and Mozambique. From 2004/05 to 2007/08, FEWSNET (2008) shows an average of over 120,000 mt of maize per year traded by small informal traders across borders in the region, with a peak of nearly 180,000 mt during 2005/06. Over half the yearly volume flows from northern Mozambique to Malawi. And because these data are for monitored border posts only, they underestimate total informal trade. Whiteside (2003) estimates that up to 150,000-250,000 mt of maize flow just from Mozambique to Malawi during years of good production in Mozambique and high demand in Malawi. Tanzania also becomes a major supplier to Malawi in some years; FEWSNET recorded about 85,000 mt flowing this way during the 2005/06 crisis. These volumes are a substantial share of total imports during crisis years. Small-scale informal traders are not as encumbered by customs clearance regulations as larger formal grain traders and hence can respond to arbitrage opportunities more quickly. Increased productivity leading to greater surplus production within the region would allow informal cross-border trade to play an even larger role to relieve future food production shortfalls. However, of the three countries, only Mozambique currently allows open cross-border trade, and even it has banned the bicycle trade; Zambia and Malawi have imposed full maize export bans.

Table 2. Correlation Coefficients of Reported Maize Production among Selected Southern African Countries, 1990-2005

		South Africa	Zambia	Zimbabwe	Mozambique	Malawi
South Africa	1990-1999		0.66**	0.93***	0.18	0.12
	1996-2005		0.36	0.51	0.04	-0.18
Zambia	1990-1999	0.66**		0.77***	-0.04	0.36
	1996-2005	0.36		0.27	-0.08	0.06
Zimbabwe	1990-1999	0.93***	0.77***		0.30	0.22
	1996-2005	0.05	0.27		-0.88***	0.21
Mozambique	1990-1999	0.18	-0.04	-0.30		0.65**
	1996-2005	0.04	-0.08	-0.88***		-0.20
Malawi	1990-1999	0.12	0.36	0.22	0.65**	
	1996-2005	-0.18	0.06	0.21	-0.20	

V. CHARACTERIZING THE CRISES

Table 3 provides summary information on the five main regional crises since 1992. A key point is the widely divergent characteristics of each crisis. The 1992/93 crisis was spurred by a massive, region-wide drought. Production fell by more than half in every country, and by nearly two-thirds across the region. Regional stocks were depleted prior to the harvest, severely limiting the scope for intra-regional trade. Satellite and rainfall monitoring provided clear and early warning of the shortfall. An estimated 12 million metric tons of food aid arrived in the (broader SADC) region, complemented by US$4 billion of commercial imports (DeRose, Messer, and Millman 1998). By all reports, the response was sufficient to avoid drought related deaths in the region.

1995/96 saw a major but less severe drought in South Africa, Zambia, and Zimbabwe. Official production data in Malawi and Mozambique showed increases of 60% and 50% from the previous year, respectively. Regionally, the harvest was nearly double that of 1992, but about half the average of the previous two years. Scope for regional trade was thus greater than in 1992/93, but still limited, since Mozambique's surplus was in the north, far from all but Malawi (which needed few imports), and South Africa had a substantial deficit. INTERFAIS shows that cereal food aid arrivals in Zambia, Zimbabwe, Malawi, and Mozambique exceeded 600,000 mt.

During 2001/02, regional production was less than 10% below its 1990-2005 mean, and high beginning stocks in South Africa, Malawi, and Zambia meant that intra-regional trade could meet most countries' aggregate cereals needs.[14] FEWSNET put out monthly bulletins in each country and regionally, detailing supply/demand balances, price movements, stock levels, and progress on imports. INTERFAIS data indicate that only 300,000 mt of cereals food aid

Table 3. Summary of Production and Stock Outcomes for Southern African Crises, and Scope for Trade

Marketing year	Regional Situation			Scope for Regional Trade
	Production Outcome	Beginning Stocks	Overall Supply	
1992/93	-65%	Very low	Massive deficit, > 10 mmt	Very little. Need for massive imports (commercial and food aid). Market mechanisms important in distribution of imports.
1995/96	-37%	Very high, > 4mmt	Deficit 2 mmt	More than 1992, but modest; Mozambique still deficit, imported from Republic of South Africa (RSA), and RSA itself had a deficit.
2001/02	-9%	About average, > 2mmt	Small deficit, ~ 1mmt	Great scope for trade; high beginning stocks meant regional supplies sufficient to cover needs. Exports from RSA and northern Mozambique.
2002/03	-1%	Historically low, <500,00 mt	Deficit up to 3mmt	Great scope for trade due especially to surplus in RSA. Exports from RSA and northern Mozambique; also from Tanzania.
2005/06	+15%	Above average, ~ 3 mmt	Surplus up to 2 mmt	Great scope for trade due to large surplus in RSA (especially early in season, as prices in RSA were very low). Exports from RSA and northern Mozambique

Note: Production outcomes are relative to the 1990-2005 mean. Source: FAOSTAT for production data; FEWSNET for stocks; INTERFAIS for food aid.

[14] Food aid or other income transfers would still be needed for households struck by crop failure or whose production, as in Malawi, was wiped-out by floods.

entered the four countries, two-thirds of it destined for Mozambique. Yet prices spiked in Malawi and Zambia far beyond import parity. Key questions are whether important early warning information was missed, whether any of the information was wrong, and why Zambia and Malawi were unable to prevent price spikes through efficient trade.

The proximate cause of the 2002/03 food crisis[15] was slightly below normal production in 2002 in the face of historically low incoming stocks, as a result of the 2001 shortfall. Together, these led to an estimated regional food deficit of about 3m metric tons. Regional production in 2002 was slightly higher than in 2001, and about equal to the 1990-2005 mean. Regional stocks at the start of the 2002/03 marketing season, however, were at least 1.5m metric tons below the lowest level of the previous five years, and nearly 3m metric tons below incoming stocks the previous year (Mano, Isaacson, and Dardel 2003). Tschirley et al (2006) suggest that, despite concerns about slow response during the crisis, the response was in fact quite timely. Darcy and Hofman (2003, p. 43) consider it a "striking example of a coordinated multi agency assessment process" and suggest that the assessment methods achieved greater standardization than has been typical in past crises.

Regional production in 2005 was 15% *above* the 1990-2005 mean. This high production, however, was driven almost entirely by South Africa. Mozambique's official data also reported a good harvest, though this was concentrated in the north of the country. Production in Malawi and Zimbabwe was about 30% below normal, and Zambia was nearly 10% below normal. In addition to the good aggregate production, stocks were relatively high, creating an estimated regional surplus of 2 mmt. By February of 2005, three months prior to the start of the harvest, FEWSNET and SADC were giving clear early warnings for southern Mozambique, Malawi, and most of Zimbabwe; Zambia began to be included by April, though SADC and FEWSNET expected high carryover stocks to cover any deficit there.

From February through August 2005, prices in South Africa were lower than they had been since 2000, just over half their level during the same period of 2002. The combination of predicted production shortfalls in Malawi, Zimbabwe, and Zambia with high production and low prices in South Africa prompted FEWSNET in March to "advocate early planning (to) help avert any food crisis … early import planning is urged for those countries facing a national shortfall". This warning proved to be unfortunately predictive of problems to come, as we will see below.

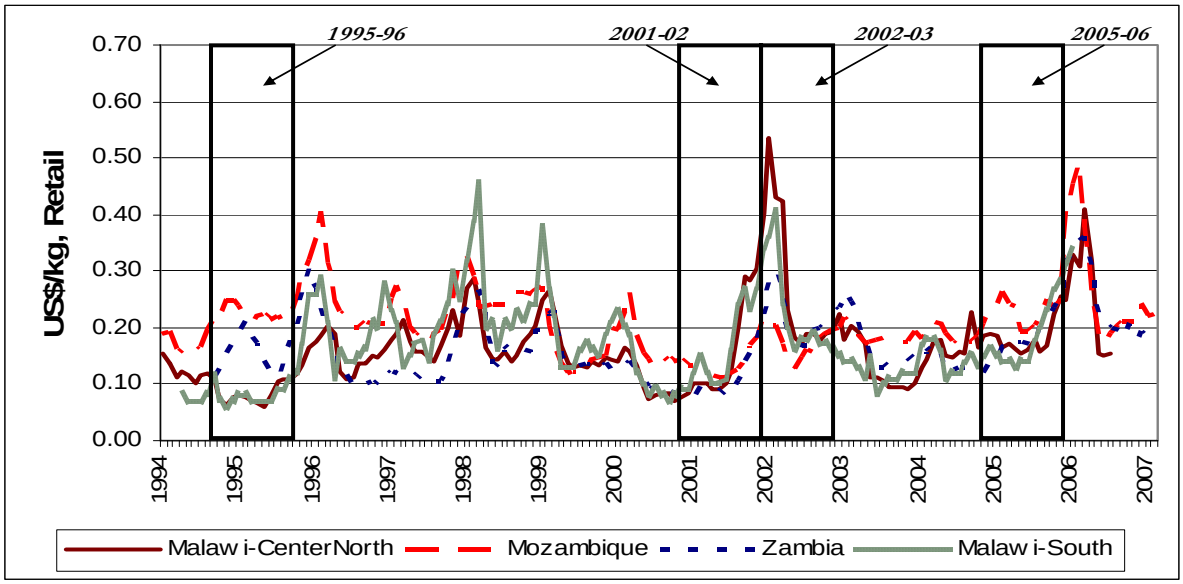
[15] The discussion of this crisis draws heavily on Tschirley et al. 2006.

VI. ASSESSING COUNTRY RESPONSE: HOW WELL HAVE POLICY MAKERS ADJUSTED TO THE NEW ENVIRONMENT?

Figure 2 shows mean retail prices for white maize grain in the three focus countries. Five points stand out. First, prices throughout Malawi greatly exceeded those in Mozambique and Zambia during the 2001/02 crisis. Second, prices in southern Mozambique trended steadily downwards through 2003, and price peaks there during the 2001/02 and 2002/03 crises were not nearly as high as in Malawi or Zambia. Third, however, prices in Mozambique skyrocketed during the 2005/06 crisis, reaching historic highs in dollar terms and exceeding those in the other two countries by nearly 40%. Mozambique's previous historic high, during the 1995/96 crisis, could be seen as driven by a production and marketing system that was still recovering from the devastating civil war; that claim cannot be made for the most recent crisis. Fourth, unlike the other two countries, Zambia saw price spikes during both the 2001/02 and 2002/03 crises. Finally, prices in dollar terms reached historic highs in southern Mozambique and Zambia during the 2005/06 crisis, but not in Malawi.

These price spikes matter for rural- as well as urban households. Among rural households in eastern and southern Africa, those in drought prone areas are the most likely to be net buyers of maize on a regular basis, even during non-drought years. For example, 71% of rural households in southern Mozambique were net buyers of maize during the 2001/02 marketing season, compared to about 50% in the surplus north (Tschirley and Abdula 2006). In Zambia, over 50% of households in drought prone Southern Province were net buyers during 2004, compared to about 20% in northern province. In both countries, the poorest are the most likely to be net buyers and spend far higher shares of their income on these purchases; in Zambia, the bottom quintile of households nationally spent about 40% of its income on maize purchases in 2004 (Tschirley 2007). Price spikes thus have enormous effects on the real incomes of those that can least afford it: the poorest households in the most drought prone areas.

Figure 2. Maize Grain Prices in Southern Mozambique, Southern/eastern Zambia, and Southern and Central Malawi, 1994-2007 (US$/kg)



Data sources: Mozambique: *Sistema de Informação de Mercados Agrícolas*; Malawi: FEWSNET; Zambia: Central Statistical Office monthly price files.

The earlier characterization of production and stocks in each crisis made it clear that, during all three crises of this decade, regional trade could have played a major role in meeting national deficits and stabilizing prices. We will also find that early warning during all three recent crises, with some exceptions for 2001/02, was early, frequent, detailed, and relatively accurate. Despite this, Zambia and Malawi experienced price spikes during two of the crises, and Mozambique did so during the last crisis. In the next section, we review each country's experience in more detail, in an attempt to understand why this happened.

6.1. Malawi

Malawi's food policy is marked by the heaviest direct government involvement of any country in the region, in three ways[16]: government controls all formal maize imports, the National Food Reserve Agency (NFRA) uses local purchases and imports to stock a food security reserve as high as 180,000 mt of maize, and it sells preferentially to its government parastatal, Agricultural Development and Marketing Corporation (ADMARC) (periodically banning sales to private traders), which operates a large network of retail shops selling at below market prices. This combination of factors makes it very risky for large formal traders to consider importing maize grain, even if they were allowed to do so. Informal, smaller-scale trade can get around these restrictions and can also source grain more rapidly than government, but requires that supplies be available in northern Mozambique, southern Tanzania, or eastern Zambia; if these areas are in deficit, the informal trade's ability to meet market demand is limited, and the country must rely on formal imports and food aid coordinated by government and donors.

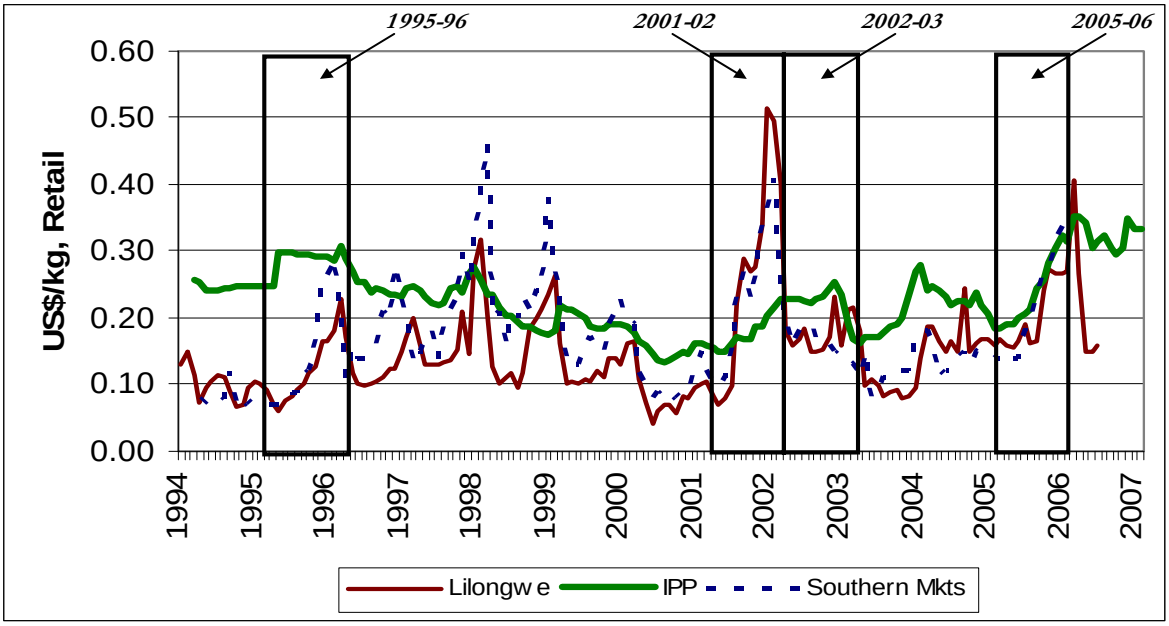
Figure 3 on the following page shows retail maize grain prices in Lilongwe in the center, an average of three southern markets, and wholesale import parity from South Africa. 2001/02 stands out for skyrocketing prices far above import parity. 2002/03 stands out for low and declining prices in the south throughout the marketing season, while 2005/06 saw large price increases in domestic markets that essentially tracked sharp increases in import parity.

6.1.1. The 2001/02 Crisis: An Unexpected and Very Large Price Spike

Malawi's 2001/02 crisis has been referred to as "the worst famine in living memory" (Devereux 2003b; see also Save the Children 2003). It is clear in hindsight that the country was extremely vulnerable to mismanagement of markets and trade during this crisis, for a number of reasons. After a record crop in 2000, 2001 crop estimates were revised downward on three separate occasions, from a 15% reduction below the previous year in February, to 24% in April, and finally to 32% in June. Yet final total production figures were thought to be only slightly below average, and good production of tubers was expected to more than cover any food gap (FEWSNET). Government and donors thus had no reason to be alarmed by June of 2001, despite official maize stocks being the lowest on record. Additionally, Mozambique had reported a production increase of 12%, suggesting that informal trade could help cover any deficits. Prices in northern Mozambique during May and June reinforced this idea, lying well within the normal range for that time of the year.

[16] Given the uncertainty regarding the extent to which the announced ban on private maize trade will be implemented, this discussion focuses on policy and practice in place at the time this paper was submitted.

Figure 3. Maize Grain Prices at Retail in Lilongwe and Three Southern Markets, and Import Parity from South Africa, 1994-2007 (US$/kg)



Data sources: SAFEX Randfontain South Africa prices as reported by the South African Grain Information System, Zambian haulier data files on monthly transport rates from Johannesburg to Lusaka, FEWSNET on local market prices.

Circumstances began to change rapidly in July and August, but the indicators of this change – prices in Malawi and northern Mozambique – are not the type of information that governments and relief agencies are accustomed to reacting to quickly. Retail maize grain prices in US$ in southern Malawi surged nearly 50% from June to July, then rose even more in August and September. This price information was widely available in Malawi to those wishing to track markets, and was reported by FEWSNET in its monthly bulletins. Meanwhile, prices in northern Mozambique also surged. By August, real prices there had equaled their historical highs for the month, then moved 40% above previous highs in September and continued to rise sharply after that. By the height of the hungry season in March 2002, real prices were double their previous hungry season high. This extraordinary price increase clearly suggests that production in northern Mozambique was substantially lower than official estimates had indicated.

Reinforcing the price information was the fact that ADMARC and NFRA announced plans in June to purchase 180,000 mt of maize in the local market, but had procured almost nothing by August, when government announced plans to import 150,000 mt of maize from South Africa. Planned government imports rose to 220,000 mt by October, but by January 2002 only 40,000 had arrived. Meanwhile, ADMARC depots ran out of maize and could not defend the ceiling price. Amidst the ensuing panic, maize prices in the north soared to double their previous high, while in the south they rose higher than any level since 1997/98.

Most discussion of this crisis has focused on the draw-down of the national stock during 2000 and 2001 and on the apparent over-estimation of the cassava harvest during 2001. The delayed imports are explained by transport bottlenecks (Devereux 2002b). It would be

useful, however, to ask other questions. First, why did government believe that purchasing grain locally in the midst of a (national) shortage would help stabilize markets? Second, why did government continue to control imports in the face of skyrocketing prices, rather than opening the borders to any private trader wishing to import? Both decisions appear to have been based on the conviction that private markets would not respond and that poor consumers would be exploited. Yet the result from open borders could hardly have been worse than what actually occurred. Third, why was government able to import only 40,000 tons by January 2002 against planned imports of 180,000 mt? We suggest that the focus on inadequate buffer stocks and over-estimation of tuber production, while not irrelevant, has distracted attention from these more fundamental questions which need to be answered if Malawi is to find an efficient and effective way to respond to future food shortfalls.

6.1.2. 2002/03: A Desire to Avoid a Repeat of the Previous Year Results in Huge Government Imports, Over-supply, and Heavy Financial Losses the Following Year

The 2001/02 crisis unleashed a social and political dynamic that made government and donors especially sensitive about potential future crises (House of Commons 2003, p. 29). Thus, when the food balance sheet in May 2002 forecast a deficit of 433,000 metric tons for the coming season, decision makers acted promptly. The country imported 253,000 metric tons of maize grain entirely through NFRA (independent private imports were not allowed), and arranged 151,000 metric tons of food aid, for a total formal inflow of more than 400,000 metric tons, nearly covering the forecasted deficit. Despite large informal flows of white maize from Mozambique in 1997/98 and 1998/99, decision makers did not take this potential flow into account. Best estimates are that 150,000-250,000 mt of maize entered Malawi informally from Mozambique, leaving the country with a maize surplus of about the same amount (Whiteside 2003). In March 2003, facing a good incoming harvest and the prospect of storing maize for over a year, government began selling its stock at very low prices.

The impacts of these actions on maize markets are apparent in Figure 3 on p. 15. From their peak in February 2002, prices in the south in both US$ (shown in the graph) and nominal Kwacha declined nearly continuously for 16 months through June 2003, the longest period of sustained price decline in at least ten years. Mean prices during 2003 were lower than any year since 1995, and less than two-thirds the levels in Zambia and southern Mozambique. While such prices benefitted consumers, they provided little incentive to farmers, and also reflected very large government costs for holding stock and for selling at prices below costs. By eliminating any seasonal price rise during the 2002/03 marketing season and pushing prices near historic lows, government may also have exacerbated two medium- to long-term problems. First, it eliminated incentives for private traders to store grain, and also reinforced the sense that future shortages may not provide profit opportunities for importers. This undermines market development and consumer interests.[17] Second, it reduced prices received by Mozambican farmers; since these farmers could be the most reliable suppliers of maize to Malawi for many years to come, reducing their production incentives runs counter to the country's long-term interests.

[17] The argument that trader profit opportunities are important for the well-being of consumers rests on the empirical regularity that more developed markets generate less seasonal price variation than do underdeveloped markets. For example, typical seasonal increases in retail maize grain prices in South Africa are less than 20%, compared to 50% in southern Mozambique, about 65% in Zambia, and over 90% in southern Malawi (Tschirley et al. 2006).

6.1.3. 2005/06: Continued Reliance on a Cumbersome Planning Approach Means that Large Potential Gains Are Missed

Early warning during 2005/06 was less ambiguous than during 2001/02. By February (three months before the start of the harvest), FEWSNET reported Ministry of Agriculture estimates of a 25% reduction in the coming harvest, leaving an anticipated maize deficit of 300,000-500,000 mt. The regional bulletin of the same month advised governments and donors in Zimbabwe, Malawi, and Zambia to plan immediately for imports, based on expected national deficits but high production and low prices in South Africa. FEWSNET also paid much closer attention to price movements this year than in 2001/02. In June, they highlighted the sharp price rises in May, far earlier than normal; by June and July, the bulletins clearly showed prices above even those of 2001. These were clear and early indicators of problems.

Despite the warnings, government placed an early season tender for only 27,000 mt, meant to replenish the Strategic Grain Reserve. Another tender, for 93,000 mt, was not placed until late July, and grain under that tender did not begin arriving until September, by which time local prices had risen dramatically. Import parity prices from South Africa also began a dramatic rise in September, driven primarily by increased transport costs, as a result of heavy demand by other deficit countries.[18] Meanwhile, monitored informal imports from Mozambique totaled 50,000 mt between April and August, but fell sharply from that time forward. From September 2005 to March 2006, real prices in northern Mozambique were at the second highest levels ever recorded (lower only than 2001/02), indicating once again that official figures had over-estimated production in that country. Informal traders began switching to Tanzania in September. By February of 2006, about 146,000 mt of monitored maize had entered from Mozambique (67,000) and Tanzania (79,000), with unknown additional quantities entering through unmonitored border points. This trade, plus formal imports and food aid, prevented prices from rising to the levels seen in 2001/02, but both US$ and real kwacha prices in the center of the country reached the second-highest levels on record, while in the south they rivaled the levels of 2001/02.

Summarizing, prices during this crisis did not rise above import parity, but they rose much higher than they would have if trade had been efficient; large potential food security benefits were foregone due to reliance on a cumbersome public sector planning process.

6.2. Zambia

Unlike Malawi, the government of Zambia does not operate a retail maize selling network and does not directly attempt to control retail prices. It does, however, purchase substantial quantities through its Food Reserve Agency (FRA). Driven in part by the need to protect FRA, government comprehensively regulates external trade, placing and lifting export or import bans and tariffs depending on perceived supply, and involving itself directly in import decisions when the national crop is short. It also preferentially channels publically imported grain to industrial millers and sometimes subsidizes the cost of those imports to the millers. Private traders are typically allowed to import grain on their own account (unlike in Malawi),

[18] Transport costs actually began rising in April of 2005. From that time through the end of the 2005/06 marketing season, IPP rose by nearly US$130/mt, and changes in transport costs accounted for 43% of the rise; during previous periods of sharp rises in IPP, transport accounted for only 13% (2003/04) and 1% (2001/02) of the rise.

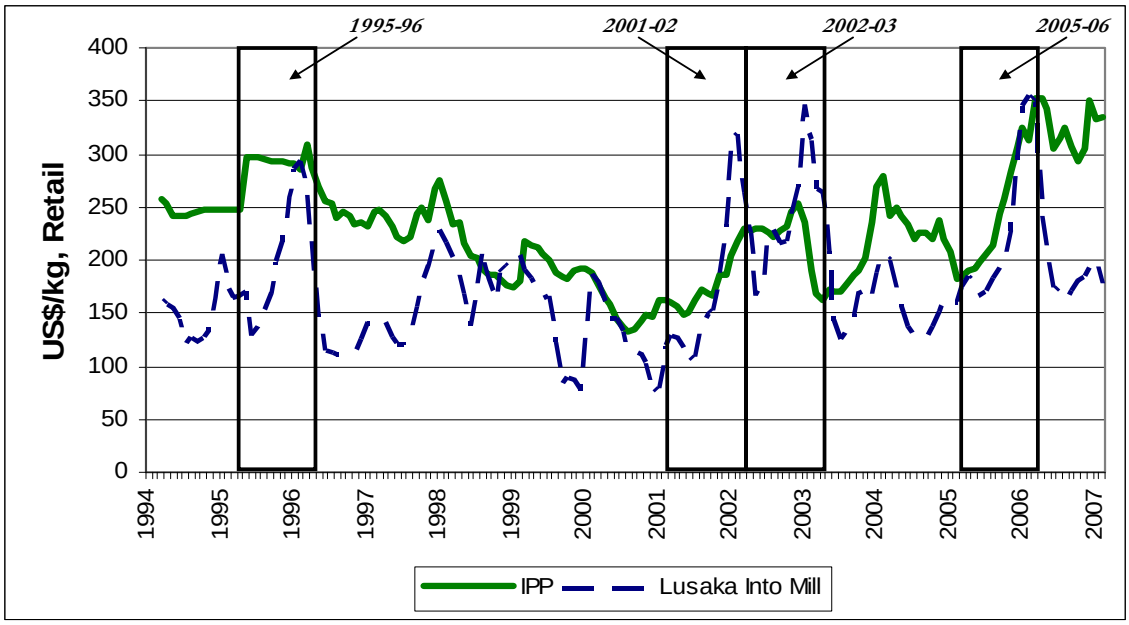
but must carefully factor government decisions into their plans. The dependability of government statements and the level of subsidy to commercial millers thus become critical factors in market performance in Zambia.

Figure 4 shows that domestic wholesale prices rose well above import parity during the 2001/02 and 2002/03 crises. Patterns during the 2005/06 crisis are similar to Malawi: US$ prices went higher than during the two previous crises, but remained within the rapidly rising import parity level. This means that, during the first two crises, consumers paid higher prices for maize than they would have if markets had performed efficiently. Why didn't traders import maize during these periods?

6.2.1. 2001/02: Heavy Control of Imports, Confusing Signals, and Maize Imports Preferentially Channeled to Commercial Millers Result in Big Price Spikes[19].

In July 2001, Zambia's food balance sheet indicated a commercial import requirement of 200,000 tons of maize. In August, government announced its intention to import that quantity of maize and to sell it to specified commercial millers at roughly $75 per ton below CIF. Yet almost no government maize imports had arrived by December. During this period, private traders refrained from importing, due to government's plans to deliver subsidized supplies to millers. As a result, local prices soared beyond $350 per ton in major urban centers in late 2001 and early 2002. If imports had arrived on time, they could have been made available without subsidy at $200 to $225 per ton. Government imports started arriving only in January 2002 and were able to drive prices below IPP the next month.

Figure 4. Maize Prices in Zambia, Wholesale Markets and Import Parity from South Africa, January 1994 to September 2007



Data sources: SAFEX Randfontain South Africa prices as reported by the South African Grain Information System, Zambian haulier data files on monthly transport rates from Johannesburg to Lusaka, Agricultural Market Information Centre wholesale maize price data, and CHC local price reports.

[19] This section draws from Nijhoff et al. 2002.

Government's handling of the 2001 maize production shortfall had three major effects. First, it stymied the potential for the market to respond to import incentives. Millers receiving imported maize from government at $160/mt had a major advantage compared to other millers and traders who faced commercial import costs of $220-260/mt. This situation effectively froze out of the market all traders, and all millers other than those chosen to receive subsidized imports. The second outcome was temporary maize shortages and prices well above import parity. Third, the subsidy on maize importation was not passed through to consumers: breakfast meal prices remained high throughout 2002. Maize grain prices dropped over 60% from December 2001 to April 2002, but breakfast meal prices in Lusaka declined by only 15% during the same period. This suggests that much of the subsidy was captured by the few millers receiving the subsidized imported grain from the government, or retail traders who bid up the price in response to continuing local scarcity, indicating that the imported volumes were insufficient to meet the entire shortfall.

The general public and some analysts have interpreted the skyrocketing prices as evidence of market failure. However, since wholesale maize prices started to be collected by the Ministry of Agriculture in 1994, these market prices have never exceeded import parity except in years when the government attempted to arrange imports.

6.2.2. The 2002/03 Crisis: Government Controls and a Restricted Definition of "Private Sector" again Results in High Price Spikes.

The May-June 2002 FEWSNET bulletin in Zambia clearly laid out the dimensions of the potential crisis facing the country: the national maize crop had declined by 24%, 2.3m people would need relief food, ending stocks on 1 May were only 20,000 mt, and the country had a likely maize deficit of 630,000. FEWSNET further stated "the government has sufficient information … and should avoid … unnecessary delays … Firm import commitments need to be made very quickly."

Government tried to do exactly this, working with "the private sector" to agree on import targets. However, government worked only with commercial millers; it controlled import permits, worked with millers to agree on how many permits and how much volume to approve, and appears not to have involved private traders in any of these discussions. There are at least two problems with this approach. First, the commercial milling sector in Zambia is quite concentrated. Real prices on maize meal began to decline several years ago primarily because grain became more commonly available in markets, which generated competition from thousands of small-scale mills. The decision to work exclusively with a concentrated commercial milling industry during a period of local maize shortages restricted competition when it was sorely needed. Second, the refined maize meals that commercial millers produce are necessarily more expensive than the whole meals that come out of the small-scale sector, and produce less human food due to low extraction rates.

Two predictable results flowed from this approach. First, government ended-up accusing millers ("the private sector") of not importing enough grain, while millers said they imported what the market would bear, and suggested that at least 60,000 mt had entered informally from Mozambique and Tanzania. Second, maize grain and meal prices surged, once again, well above import parity. This price surge is *prima facie* evidence that, in fact, not enough grain was imported. The primary reason for this, however, was almost certainly that

government actions restricted private importation to Zambia's concentrated milling sector and excluded its more competitive maize trading system. Ironically, it is likely that the sector least expected by some policy makers to operate in the interests of farmers and consumers would have, due to competition and not charitable intentions, helped to substantially reduce prices during this crisis.

6.2.3. 2005/06: Prices Remain Around Import Parity, but Slow Decision Making Results in Lost Opportunities to Keep Prices Substantially Lower.

At the time of the 2005 harvest, a 15% tariff on imported maize was in effect. Early estimates of a poor maize crop began to clarify the need for imports. To avoid passing the approximately $40/mt cost of the tariff to consumers during a high-price year, millers and traders requested in June 2005 that the government waive the import tariff. As shown by Mwanaumo et al (2005), the unpredictability of how the import duty issue was handled caused importers to not make firm import commitments until the import duty was waived. This was a rational response by private traders, since importing before the duty was waived would have forced them to pay at least $30-40 per ton more than competing firms who waited. The delay in waiving the duty also pushed imports into a period when IPP in Zambia (as in Malawi) was rising dramatically, driven by increased prices in South African and rapid rises in transport costs. Further delays occurred in late 2005, a result of new phytosanitary requirements. Random testing of grain in South Africa destined for Zambia added to these delays, even though government indicated that testing is not time consuming and should not cause additional delays. The combined effect of these factors is that, as of mid-December 2005, the private sector had imported only 40,000 mt of maize, and government had yet to import any maize.

The magnitude of the crisis was moderated by informal cross border trade. Maize industry representatives estimate that 40,000 to 60,000 mt of maize were imported from Tanzania by small traders.[20] Maize prices in Kasama, an urban center located in a generally maize-deficit region close to the Tanzanian border, were almost 20% lower than in Lusaka, highlighting the benefits of informal trade to Zambian consumers.

However, the full benefits of cross-border trade were missed because of a discriminatory duty waiver system. The waiver was provided only to millers and traders able to obtain import licenses. Small traders not able to acquire import licenses paid roughly US$15/mt more to import. As these traders are the main source of maize for small millers, the duty resulted in higher maize prices for low-income consumers during a deficit year.

To summarize, the response to the 2005/06 production shortfall averted prices surging above import parity. However, import delays caused by unpredictable government action, and the import duty on informally imported maize combined to increase consumer prices well above what they would have otherwise been.

[20] FEWSNET recorded just over 13,000 mt of informal imports from Tanzania, confirming the perception that these data put a *lower bound* on informal trade volumes.

6.3. Mozambique

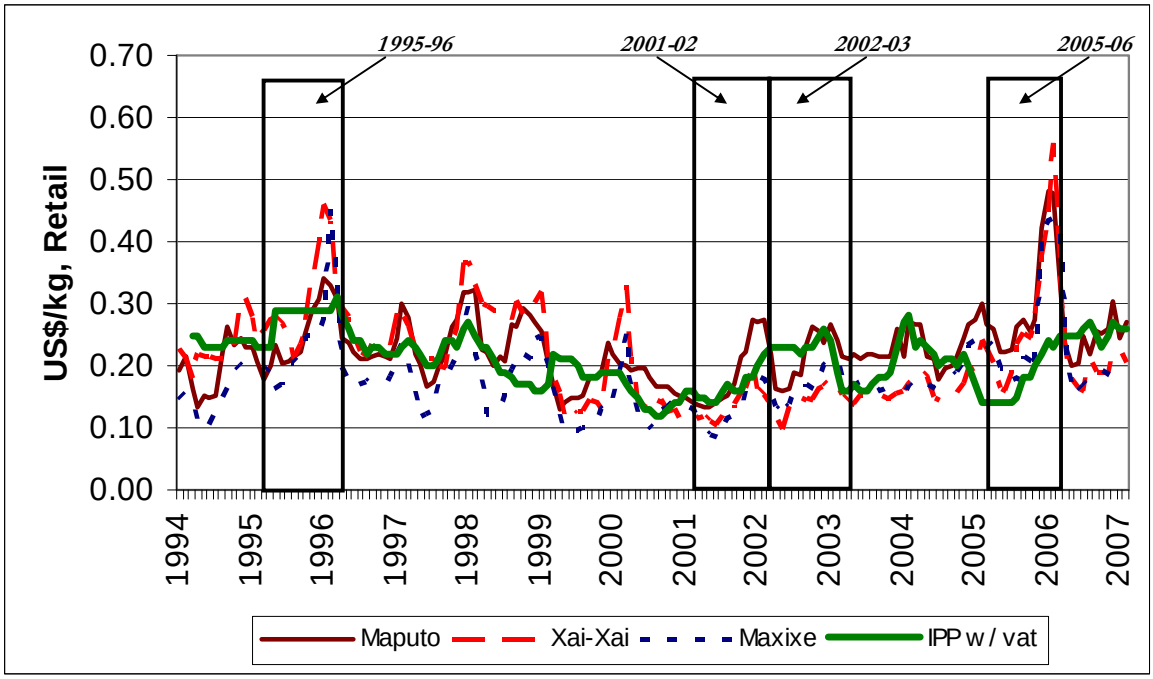
Mozambique has maintained an open trade policy since at least the late 1980s. Because of the country's north-south orientation and poor transport links, the surplus north is unable to supply the perpetually deficit and more urbanized south. As a result, the north exports maize most years to Malawi, much of it through informal channels, while industrial millers in the south import grain from South Africa. The center is typically but not always surplus. Informal traders bring grain from the center to the south every year, but volumes can fall dramatically when the region has poor weather. Over the past five years, Zimbabwe has also drawn maize out of central Mozambique, through informal channels.

Mozambique does not hold a food reserve, has never placed an import or export ban on maize, and does not place and remove import or export tariffs depending on supply conditions. The country does, however, have one important policy failing on maize trade: importers of maize grain are eligible for full reimbursement of the 17% value added tax (VAT) only if they process the grain into meal. For this and other reasons (Tschirley, Abdula, and Weber 2006), the only maize grain regularly available for sale as grain in informal markets of the south over at least the past 10 years has been from the south and center of Mozambique. As we will see below, this can cause sharp price spikes in southern markets when the center is affected by drought.

During the present decade, Zambia and Malawi highlight how government action can create price spikes when efficient trade would have avoided them. Prior to the 2005/06 crisis, Mozambique was the counterfactual: open trade allowed the north to export regularly to Malawi while the south imported from South Africa. As a result, typical seasonal price increases in southern Mozambique are 40% less than in Malawi, and about 25% below Zambia (Tschirley et al. 2006). Also, unlike Zambia and Malawi, Mozambique weathered the 2001/02 and 2002/03 food crises with seasonal price rises lower than any year since 1993 (Figure 5 on the following page).

2005/06 was very different, with prices rising to more than double import parity at the height of the hungry season. Three factors explain why. First, prices in the center of the country suggest that production there was more affected by the drought than official figures indicated (recall that prices in the north also surged that year). In US$ terms, prices in the center reached levels not seen since the height of the 1995/96 crisis, when it is known that production in the center was very low. In real local currency terms, prices in the center in 2005/06 were exceeded only by those in 1995/96 and 2001/02. Second, the price of industrially processed maize meal in Mozambique has been extraordinarily high since 2003, averaging nearly two times the price in Zambia during this period (US$610/mt compared to US$320/mt). Tschirley and Abdula (2007) attribute such prices to several factors, including the highly concentrated structure of maize milling in the south of the country, a 25% import duty on maize meal, and the VAT policy that penalizes imports of grain for sale as grain. Third, rice has a higher consumer budget share than maize in the south, and its real price in that region rose by nearly 40% from early 2005 to early 2006. Together, these factors created room for the price of maize grain to rise as it did. In fact, by early 2006, the price of maize grain equaled the price of rice, before falling back with the onset of the 2006 harvest.

Figure 5. Retail Prices of Maize Grain in Three Markets of Southern Mozambique, and Import Parity from South Africa (1994-2007)



Data sources: SAFEX Randfontain South Africa prices as reported by the South African Grain Information System, transport data from Mozambican millers, Mozambique prices from *Sistema de Informação de Mercados Agrícolas*.

Mozambique is rightly cited as an important example in southern Africa of how open trade can benefit farmers and consumers while avoiding the misallocation of government time and resources. Despite lying nearly 1,000 km from surplus producing areas, average maize grain prices in southern Mozambique since 1999 have exceeded those in Zambia and Malawi by only 10%, and their coefficient of variation has been 30% lower than in those two countries; in the center, prices have been 15% *lower* and the coefficient of variation has been 25% lower than in Zambia and Malawi. Meanwhile, government has spent no time or political capital manipulating import and export tariffs and bans, and has spent no money holding maize stocks or subsidizing the sale of imported maize during crises. Yet this success is being undermined by policies that allow strong market power in maize milling to maintain extraordinarily high industrial maize meal prices throughout the center and south of the country, and by the VAT policy that also favors these large maize millers.

VII. TOWARD MORE EFFECTIVE USE OF MARKETS IN EMERGENCY RESPONSE

This review suggests that, despite meaningful reform in their maize sectors, Zambia and Malawi remain caught in the trap outlined in our conceptual framework, with lack of trust leading to behavior by governments and traders that undermines the interests of both. More importantly, urban consumers, rural net buyers, and farmers in surplus zones of neighboring countries are also harmed. These behaviors threaten to become more accentuated in today's high price environment, with potentially grave consequences. Mozambique has largely avoided the trap, but remains unwilling to deal with policy and market structure problems of its own.

The literature on these types of problems suggests that they "(resist) resolution by appeal to the facts" (McBeth et al. 2007.) Yet careful, open-minded empirical analysis can make a crucial contribution to eventual resolution when it is embedded within an ongoing consultative process involving government, traders, donors, NGOs, and policy analysts; outside such a process, even the best analysis will largely be ignored except by those who already agree with it.

Fora such as these will always feature a wide array of opinion, any of which could be more influential on policy than the opinions of empirical policy analysts. To influence opinion and decisions in such a group, analysts must make special efforts to be seen as open minded in their diagnosis of problems and design of solutions. Key among these is a willingness to seek out and identify areas where markets do not perform well, and to suggest workable solutions; identifying structural and behavioral problems that might limit competition in markets is especially important. Del Ninno et al. (2004) show how carefully collected and presented evidence on the competitiveness of the import trade in Bangladesh led the government there to reduce barriers to private trade during the food crisis of 1998, stabilizing prices and dramatically reducing the public expenditure needed to deal with the problem[21]. In contrast, reasonable concern about the competitiveness of the import trade in Madagascar led government there to float its own commercial tenders in response to a crisis in 2004, undermining incentives for private trade (Paul Dorosh, personal communication, November 18, 2005).

These observations suggest that three types of analysis will be especially helpful over time in moving towards a more rational approach to emergency response in the region. First, detailed studies of the structure, behavior, and performance of staple food marketing systems will provide the kind of knowledge needed to have an informed discussion of options in the complex environments affecting government policy choice. Clearly identifying potential problems in these systems may be especially useful in showing the even-handed nature of the research and thus enhancing its credibility among skeptical observers. Second, combining these studies with careful quantitative assessment of market integration within and across countries will provide an even more robust basis for policy choice. Finally, drawing systematically on case studies of success and failure across a range of countries in promoting markets for emergency response will help countries like Malawi and Zambia see that options do indeed exist, that markets can and do make major contributions to government food security objectives under the right circumstances, and that specific steps can be taken to enhance the compatibility between government and private objectives, to the benefit of consumers and farmers.

[21] See also Dorosh, Dradri and Haggblade (2007) for evidence on how trade could reduce the cost of emergency response in Zambia.

REFERENCES

Aker, J. 2008. *Does Digital Divide or Provide? The Impact of Phones on Grain Markets in Niger*. Available at SSRN: http://ssrn.com/abstract=1093374.

Awudu, A. 2007. Spatial and Vertical Price Transmission in Food Staples Market Chains in Eastern and Southern Africa: What is the Evidence? Paper prepared for the Conference on Staple Food Trade and Market Policy Options for Promoting Development in Eastern and Southern Africa, 1-2 March. Trade and Markets Division, FAO Headquarters. Rome, Italy.

Chirwa, E. 1999. *Food Marketing Reforms and Integration of Maize and Rice Markets in Malawi*. University of Malawi, Chancellors College Working Paper WC/05/99. Zomba, Malawi: University of Malawi.

Chitundu, Maureen, Klaus Droppelmann, and Steven Haggblade. 2006. *A Value Chain Task Force Approach for Managing Private-Public Partnerships: Zambia's Task Force on Acceleration of Cassava Utilization*. FSRP Working Paper No. 21. Lusaka, Zambia. Food Security Research Project.

Conklin, Jeff. 2006. Wicked Problems & Social Complexity. Chapter 1 of *Dialogue Mapping: Building Shared Understanding of Wicked Problems*. Hoboken, New Jersey: Wiley.

Darcy, James and Charles-Antoine Hofmann. 2003. *According to Need? Needs Assessment and Decision-making in the Humanitarian Sector*. Report No. 15. United Kingdom: ODI Humanitarian Policy Group. http://www.odi.org.uk/hpg/papers/hpgreport15.pdf

del Ninno, Carlo, Paul A. Dorosh, and Kalanidhi Subbarao. 2004. *Food Aid and Food Security in the Short- and Long Run: Country Experience from Asia and sub-Saharan Africa*. World Bank Social Protection Discussion Paper No. 0538. Washington, D.C.: World Bank.

DeRose, Larie, Ellen Messer, and Sara Millman. 1998. *Who's Hungry? And How Do We Know? Food Shortage, Poverty, and Deprivation*. New York: United Nations University Press.

Devereux, Stephen. 2002a. Can Social Safety Nets Reduce Chronic Poverty? *Development Policy Review* 20: 657-675.

Devereux, Stephen. 2002b. *State of Disaster: Causes, Consequences & Policy Lessons from Malawi*. An ActionAid Report Commissioned by ActionAid Malawi.

Devereux, Stephen. 2006. The Impact of Droughts and Floods on Food Security, and Policy Options to Alleviate Negative Effects. Paper submitted for plenary session on Economics of Natural Disasters at the International Association of Agricultural Economists (IAAE) Conference, 12-18 August. Queensland, Australia.

Dorosh, Paul A, Simon Dradri, and Steven Haggblade. 2007. *Alternative Instruments for Ensuring Food Security and Price Stability in Zambia*. FSRP Working Paper No. 29. Lusaka, Zambia: Food Security Research Project.

Dorward, Andrew, J. Kydd, J. Morrison, and I. Urey. 2004. A Policy Agenda for Pro-Poor Agricultural Growth. *World Development* 32.1: 73–89.

Dorward, Andrew and Jonathon Kydd. 2004. The Malawi 2002 Food Crisis: The Rural Development Challenge. *The Journal of Modern African Studies*. 42: 343-361.

Falcone, R. and C. Castelfranchi. 2002. Social Trust: A Cognitive Approach. Chapter 3 in *Trust and Deception in Virtual Societies*, ed. Castelfranchi and Tan. Heidelberg, Germany: Springer.

FAO. 2007. *Southern Africa Programme*. Technical Cooperation Department, Emergency Relief and Development. Rome: FAO.

FEWSNET. 2002. *Is a Famine Developing in Southern Africa?* Famine Early Warning Systems Network Position Paper, July 15. Washington, D.C.: FEWS.

FEWSNET. 2008. *Informal Cross Border Food Trade in Southern Africa.* Issue 42, May. Washington, D.C.: FEWS.

Frankenberger, Tim, Kristina Luther, Karyn Fox, and John Mazzeo. 2003. *Livelihood Erosion Through Time: Macro and Micro Factors that Influenced Livelihood Trends in Malawi Over the Last 30 Years.* Tucson, Arizona: Tango, Inc. and CARE Southern and Western Africa Regional Management Unit (SWARMU).

Goletti, Francesco and Suresh Babu. 1994. Market Liberalization and Integration of Maize Markets in Malawi. *Agricultural Economics* 11.2-3: 311-324.

Haddad, Lawrence and Tim Frankenberger. 2003. *Integrating Relief and Development to Accelerate Reductions in Food Insecurity in Shock-Prone Areas*. USAID Occasional Paper No. 2. Washington, D.C.: USAID Office of Food for Peace.

House of Commons. 2003. *The Humanitarian Crisis in Southern Africa.* Volume I: Report and Proceedings of the Committee. London: International Development Committee.

International Telecommunications Union. 2007. *World Information Society 2007 Report: Beyond WSIS*. Geneva: ITU.

Jayne, T.S. and Antony Chapoto. 2006. *Emerging Structural Maize Deficits in Eastern and Southern Africa: Implications for National Agricultural Strategies*. FSRP Policy Synthesis No. 16. Lusaka, Zambia: Food Security Research Project.

T.S. Jayne, Antony Chapoto, Isaac Minde, and Cynthia Donovan. Forthcoming. *Implications of Rising World Food Prices for Agriculture and Food Security Policy: The Emerging Picture in Eastern and Southern Africa*. MSU International Development Working Paper. East Lansing: Michigan State University.

Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. 1991. Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias. *The Journal of Economic Perspectives* 5.1 (Winter): 193-206.

Loy, J.P. and R. Wichern. 2000. Integration of Zambian Maize Markets. *Quarterly Journal of International Agriculture*. 39.2: 173-198.

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

McBeth, Mark, Elizabeth Shanahan, Ruth Arnell, and Paul Hathaway. 2007. The Intersection of Narrative Policy Analysis and Policy Change Theory. *Policy Studies Journal*, February.

Mwanaumo, A., T.S Jayne, Ballard Zulu, Julius Shawa, Green Mbozi, Steven Haggblade, and Misheck Nyembe. 2005. *Zambia's 2005 Maize Import and Marketing Experiences: Lessons and Implications*. FSRP Policy Synthesis No. 6. Lusaka, Zambia: Food Security Research Project.

Nijhoff, J.J., T.S. Jayne, Billy Mwiinga, and Jim Shaffer. 2002. *Markets Need Predictable Government Actions to Function Effectively: the Case of Importing Maize in Times of Deficit*. FSRP Policy Synthesis No. 6. Lusaka: MSU/MACO Food Security Research Project.

Rashid, S. 2004. *Spatial Integration of Maize Markets in Post-liberalized Uganda.* Markets, Trade, and Institutions Division Discussion Paper No. 71. Washington, D.C.: IFPRI.

Ravallion, Martin. 1986. Testing Market Integration. *American Journal of Agricultural Economics* February 68.1: 102-109.

SARPN. 2007. *Strengthening Responses to the Triple Threat in the Southern Africa Region – Learning from Field Programmes in Malawi, Mozambique and Zambia*. Report of the regional workshop of the same name. Maputo: Southern African Regional Poverty Network.

Save The Children. 2003. Understanding And Responding To Fragile Livelihoods In Southern Africa. Mimeo.

Tostau, E. and W. Brorsen. 2005. Spatial Price Efficiency in Mozambique's Post-reform Maize Markets. *Agricultural Economics* 33.2: 205–214.

Traub, L. and T.S. Jayne. 2008. The Effects of Price Deregulation on Maize Marketing Margins in South Africa. *Food Policy.* 33.3: 224-236.

Tschirley, David. 2007. Markets, Food Aid, and Poverty in Emergency Response: Learning from the 2002/03 Crisis in Southern Africa. Presented at Health and Wealth: Linking

Policy Developments to Economic Livelihoods in East and Southern Africa, Society for International Development. 16 May. Washington, D.C.

Tschirley, David and Danilo Abdula. 2007. Toward Improved Maize Marketing and Trade Policies to Promote Household Food Security in Central and Southern Mozambique: 2007 Update. Prepared for FAO workshop on Trade Policy for Food Products Conducive to Development in Eastern and Southern Africa, 1-2 March 2007. Rome, Italy.

Tschirley, David, Danilo Abdula, and Michael T. Weber. 2006. *Toward Improved Maize Marketing and Trade Policies to Promote Household Food Security in Central and Southern Mozambique*. Research Paper No. 60E. Maputo: MA/MSU Food Security Project.

Tschirley, David, Jan J. Nijhoff, Pedro Arlindo, Billy Mwinga, Michael T. Weber, and T.S. Jayne. 2006. *Anticipating and Responding to Drought Emergencies in Southern Africa: Lessons from the 2002-2003 Experience*. MSU International Development Working Paper No. 89. East Lansing: Michigan State University.

Van Campenhout, B. 2008. Modelling Trends in Food Market Integration: Method and an Application to Tanzanian Maize Markets. *Food Policy* 32.1: 112-127.

Whiteside, Martin. 2003. *Enhancing the Role of Informal Maize Imports in Malawi Food Security*. A consultancy report for UK Department for International Development. London: UK Department for International Development.

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