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POLICY SYNTHESIS

FOOD SECURITY RESEARCH PROJECT – ZAMBIA

Ministry of Agriculture and Cooperatives, Agricultural Consultative Forum, Michigan State University and the Market Access, Trade, and Enabling Policies (MATEP) Programme, Lusaka, Zambia.

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EMERGING STRUCTURAL MAIZE DEFICITS IN EASTERN AND SOUTHERN AFRICA: IMPLICATIONS FOR NATIONAL AGRICULTURAL STRATEGIES

T.S Jayne and Antony Chapoto

Main Findings:

- Both the eastern and southern Africa regions are moving towards structural maize deficit.
- Despite the region's increasing importation of maize, maize grain prices in most of the region have relatively remained constant over the past decade and are actually trending downward in South Africa. Retail maize meal prices are trending downward in Zambia and Kenya, thanks to greater competition at the milling and retailing end of the maize value chain.
- In most countries of the region, maize 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 continued strong government operations in food markets.
- Rising maize imports is not necessarily bad as long as small farmers can be encouraged to diversify successfully into higher-return crops and off-farm activities. Governments and donors can support this process through public goods investments, greater stability in the policy environment, and supporting commercial investment in market development.

BACKGROUND: Effective agricultural and food security policies in Africa need to be based on a solid empirical foundation. Over the past decade, the maize sectors of eastern and southern Africa have undergone major changes: market reform and structural adjustment, an apparent shift in cropped area from maize to cassava and other crops, rapid growth in urban populations and the demand for food, and political instability in parts of the region.

However, there has been little effort to understand how these changes have affected trends in maize supply and demand conditions, secular price trends, and their implications for food policy in the region. If the region is indeed moving toward structural deficit, it would be expected that the price surface in the region should be moving upward toward import parity. This would have major implications for food security policy in the region.

OBJECTIVES: This note summarizes analysis[1] of trends in net maize exports over the 1960-2005 period and examines whether these trends are being reflected in changing maize price levels in the region. We then highlight the implications of the findings for countries' agricultural development strategies.

DATA AND METHODS: Data on maize and maize meal imports and exports are obtained from the FAOSTAT online database. Monthly wholesale grain prices and retail meal prices in Zambia, Mozambique and Kenya were obtained from the Ministries of Agriculture and national statistical services in each country. South Africa's maize grain and maize meal price data was obtained from the South African Futures Exchange (SAFEX) and Maize Board annual reports compiled by the Statistical Service of South Africa. All prices are deflated using real exchange rates.

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

We regressed regional and country-specific net export data on linear time trends, and on models allowing for shifts in the slope of the trend between the 1960-1981 and 1982-2005 periods.

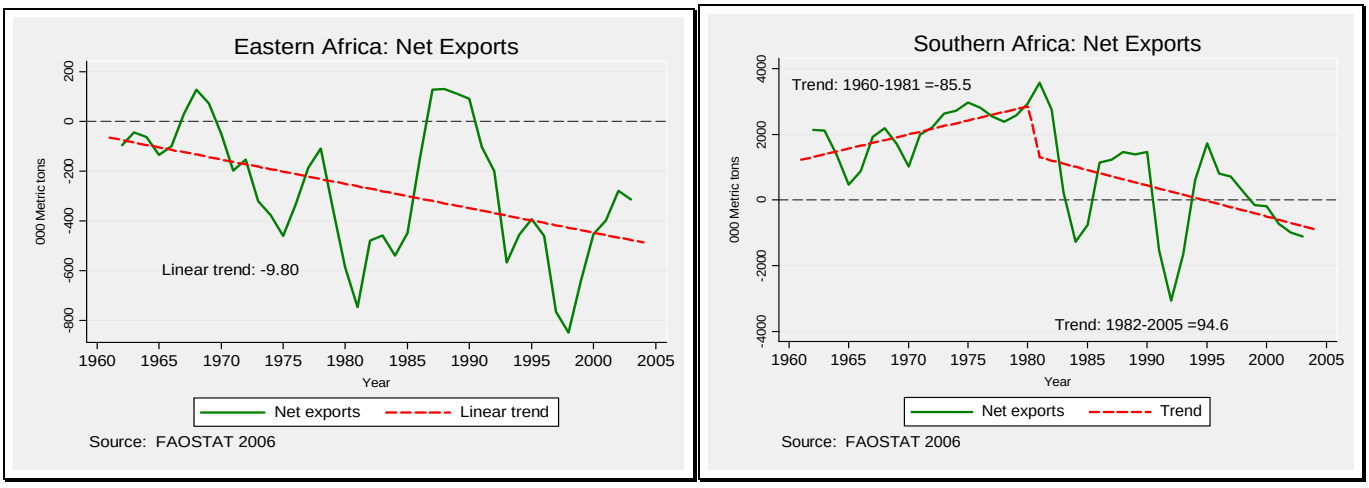
FINDINGS: ***First*, both the southern and east Africa regions are moving towards structural maize deficit.** Net exports regressed on a linear time trend in both regions show statistically significant downward slopes. Net maize (grain plus meal) exports in the southern Africa region declined at a rate of -72,201 metric tons per year for the period 1960-2005. Net maize exports over the same period in east Africa declined at the rate of -9,798 metric tons per year. There is no significant difference in the trend in net exports in eastern Africa between 1960-1981 and 1982-2005. In southern Africa, the net export trends in the two periods are statistically different. Net exports in southern Africa increased by 85,544 metric tons per year for the period 1960-1980 and then declined by 94,586 metric tons per year during the period 1981-2005.

At the country-level, there was a downward trend in net maize exports in all countries of southern Africa, with all of these being statistically significant at the 5% level. In east Africa, there was a significant downward trend in net maize exports for 2 of 6 of the east African countries (Kenya and Rwanda), while for Ethiopia the trend is positive and significant. The trend is weakly negative in Tanzania and weakly positive in DRC. Kenya, Malawi and Zimbabwe, all net exporters of maize in the 1970s and 1980s, are now chronic importers. The reduction of maize production subsidies in South Africa has also reduced the exportable surplus in that country, although it remains a reliable exporter.

***Second*, in recent years, and especially after the inception of political turmoil in Zimbabwe in the late 1990s, South Africa has become the only reliable exporter of white maize in the region.** Areas of Mozambique, Zambia, and Malawi typically produce maize surpluses, but these surpluses are usually depleted halfway through the marketing year. Urban and rural maize deficit regions have become increasingly dependent on South Africa for their residual national white maize requirements.

***Third*, despite the fact that the region is becoming more maize deficit, wholesale maize grain prices in Zambia, Kenya, Mozambique and Malawi have relatively remained constant over the past decade and are actually trending downward in South Africa. However, retail maize meal prices are trending downwards in Zambia and Kenya, whilst trending upwards in South Africa and Mozambique (figure 2A-E).**

Figure 1: Net exports of maize grain and maize meal in east and southern Africa



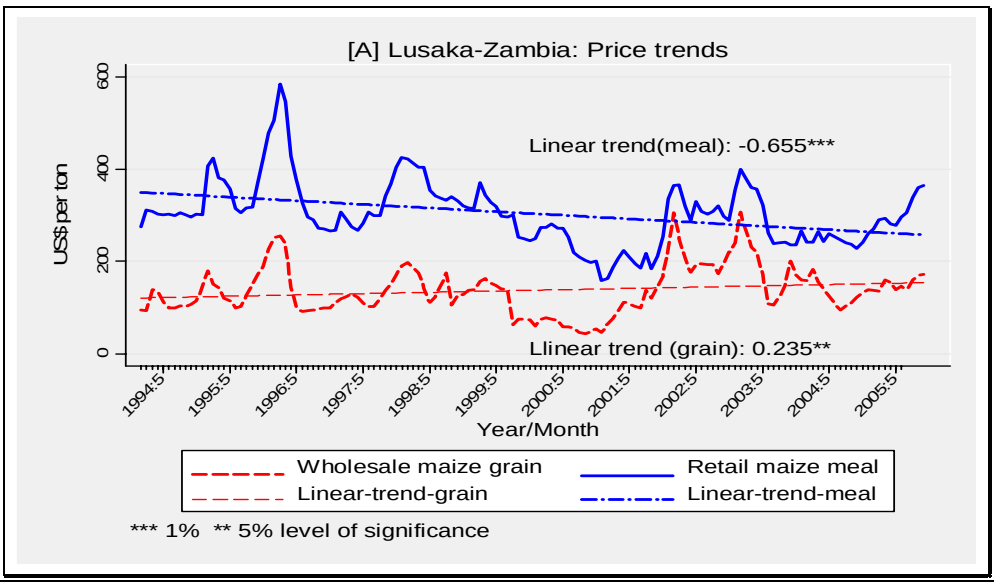
How can consumers in Zambia and Kenya be experiencing declining maize meal prices during a period when net maize imports are rising?

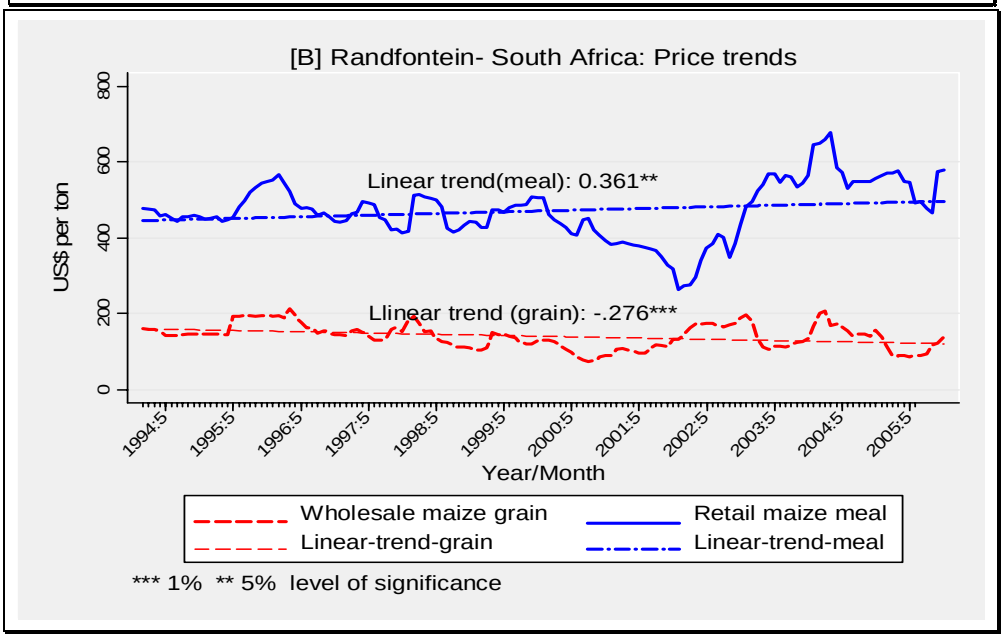
The maize market reforms of the 1990s have played an important role in this apparent paradox. Prior to liberalization, a few officially registered maize-processing firms had a *de facto* oligopoly on milling maize and supplying the retail sector. Regulations made it difficult for non-registered millers 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.

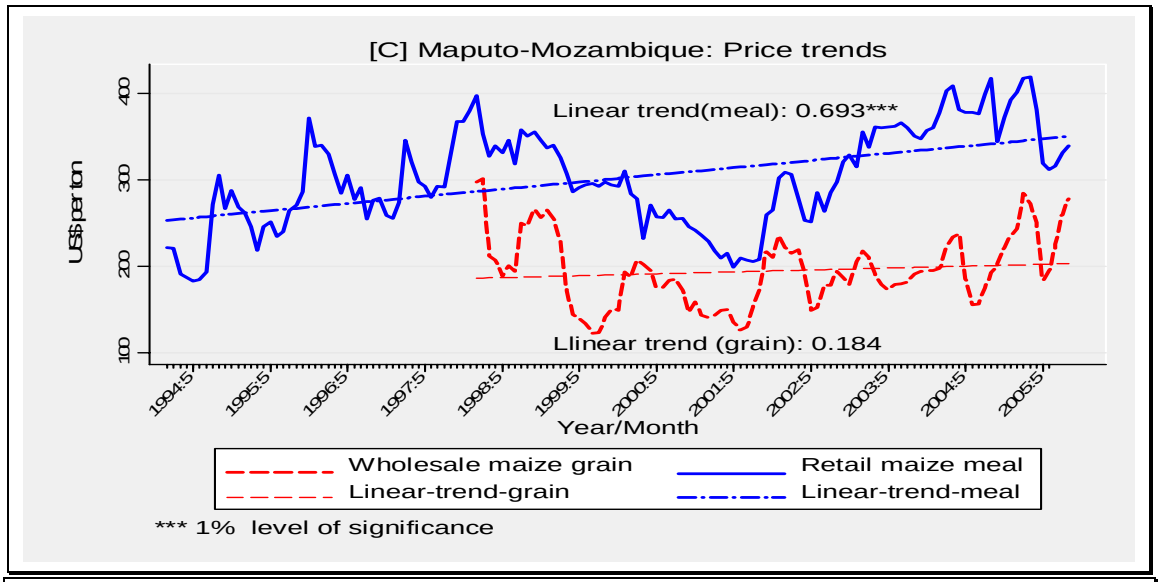
The marketing reforms induced rapid investment in medium- and small-scale milling and retailing networks. In response to greater competition, the registered large milling companies cut their prices in an attempt to regain lost market share. Increased competition at the milling and retailing stage of the maize value chain has greatly benefited low-income consumers in countries such as Kenya and Zambia.

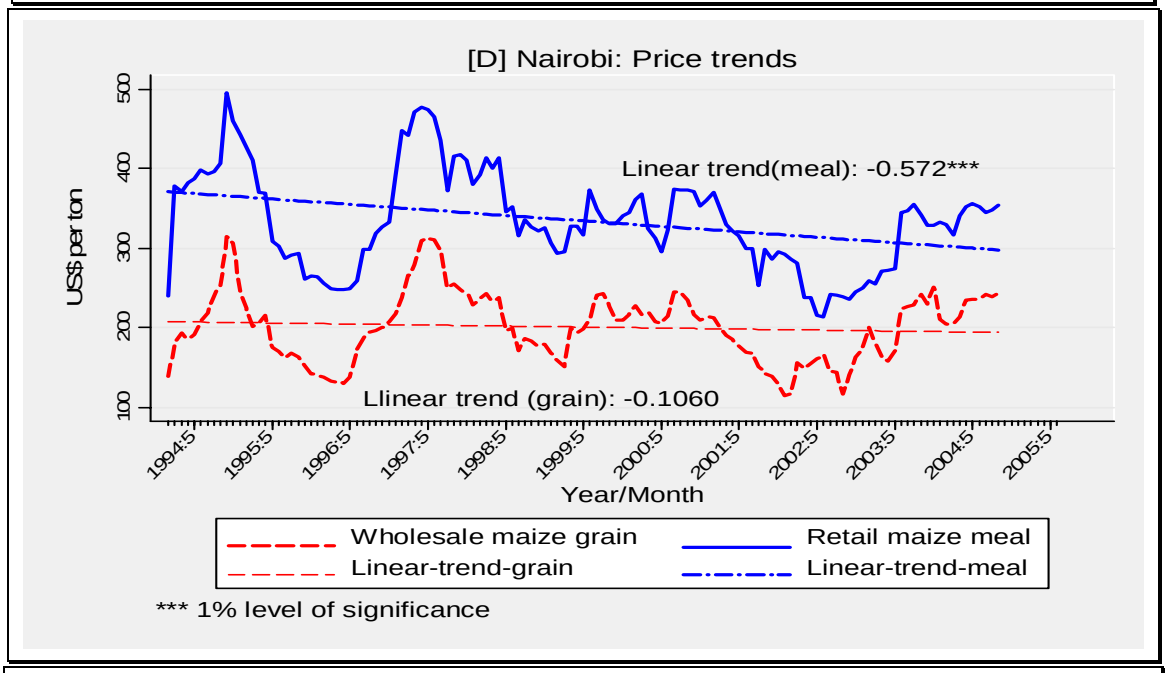
By contrast, maize meal prices have risen over time in urban areas of South Africa and southern Mozambique. The structure and behavior of the grain marketing systems in these urban areas is such that grain is often not readily available to support a thriving small-scale milling and trading system which could otherwise exert competitive

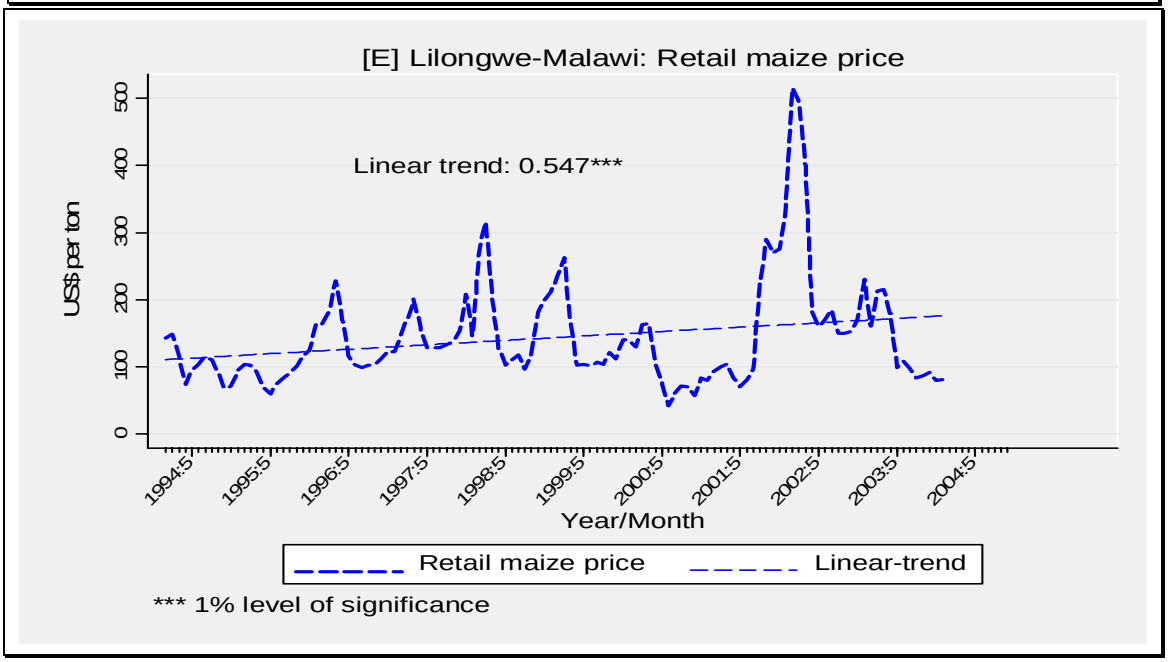
Figure 2a-e: Trends in wholesale maize grain and retail meal prices (retail maize grain prices).






[C] Maputo-Mozambique: Price trends
Linear trend(meal): 0.693***
Llinear trend (grain): 0.184
US$ per ton
100
200
300
400
1994:5
1995:5
1996:5
1997:5
1998:5
1999:5
2000:5
2001:5
2002:5
2003:5
2004:5
2005:5
Year/Month
Wholesale maize grain
Linear-trend-grain
Retail maize meal
Linear-trend-meal
*** 1% level of significance


[D] Nairobi: Price trends
Linear trend(meal): -0.572***
Llinear trend (grain): -0.1060
US$ per ton
100
200
300
400
500
1994:5
1995:5
1996:5
1997:5
1998:5
1999:5
2000:5
2001:5
2002:5
2003:5
2004:5
2005:5
Year/Month
Wholesale maize grain
Linear-trend-grain
Retail maize meal
Linear-trend-meal
*** 1% level of significance


[E] Lilongwe-Malawi: Retail maize price
Linear trend: 0.547***
US$ per ton
0
100
200
300
400
500
1994:5
1995:5
1996:5
1997:5
1998:5
1999:5
2000:5
2001:5
2002:5
2003:5
2004:5
Year/Month
Retail maize price
Linear-trend
*** 1% level of significance

pressures on the large-scale milling and retailing industries in these countries, as has occurred in Kenya and Zambia. A major priority in Mozambique, South Africa, and potentially other countries in the region is to restructure government marketing and trade policies so that grain remains available for purchase by small traders to transport and sell grain to households in rural as well as urban areas, many of who may want to acquire services of small custom millers to convert the grain for final consumption.

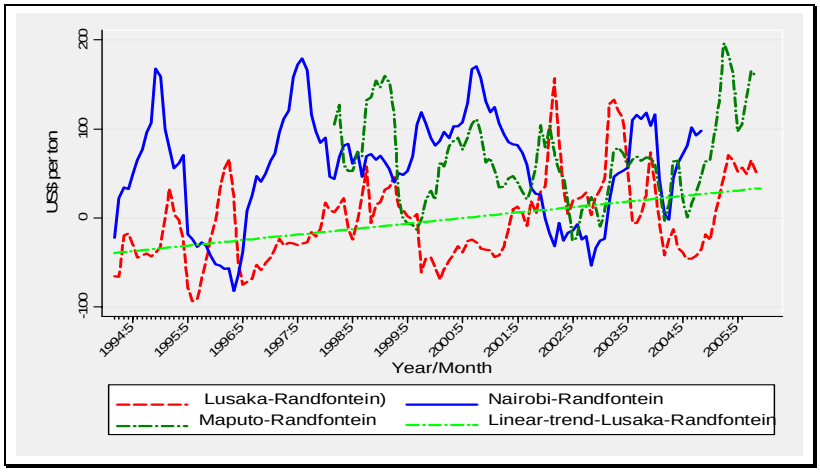
However, wholesale grain prices have not risen for small farmers and they remain highly variable. Our analysis indicates that this is primarily due to the lack of public goods investments to reduce the very high marketing costs facing traders operating in remote rural areas, a highly unstable and increasingly politicized grain marketing policy environment, and consequently, muted private sector investment in rural assembly, long-distance wholesaling, and storage in response to liberalization.

There is widespread agreement that the food marketing policy environment over the past decade has not effectively supported agricultural productivity growth for the millions of small farmers in the region. Many governments remain important players in their maize markets, both through their direct procurement and sale operations and through their use of discretionary trade policy instruments. Though the quantities they trade are smaller than during the controlled market era, marketing boards in Kenya, Malawi, and Zambia still exert a major presence in the maize markets, handling between 20 to 50 percent of marketed volumes. Many countries in the region continue to implement food price stabilization programs of various types. However government actions in the maize market have become increasingly reactive and short-term in nature, subject to unannounced policy changes that create major risks for private investment. efforts (e.g., Nijhoff et al, 2003; Rubey, 2004) These countries' market performance since the 1990s reflects not the impacts of unfettered market forces but rather the mixed policy environment of legalized private trade within the context of continued strong government operations in food markets.

Fourth, the difference between wholesale maize grain prices in Lusaka, Zambia, Maputo, Mozambique, Nairobi, Kenya and Randfontein, South Africa are trending upwards. Beginning in 2001, maize grain prices in all the countries examined here have generally moved above the Randfontein South Africa price (Figure 3). Coupled with the region's movement toward structural maize deficits, these findings suggest that much of the region is increasingly moving toward an import parity pricing situation *vis a vis* South Africa. However, small farmers' ability to benefit from rising prices in the capital cities will be constrained, once again, by poor market infrastructure and by uncertain government policies that make it risky for trading firms to invest in rural assembly, wholesaling, and cross-border trade.

Smallholder supply response is also constrained by farm structure: over half of the small farms in the region are less than one hectare in size. One-quarter of the farms are less than 0.5 hectares in size (Jayne et al, 2003). These farms cannot earn a decent income through a maize commercialization

Figure 3. Wholesale maize price spreads between Randfontein, South Africa, and various regional markets



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 toward smaller farm sizes will compel households to adopt more diversified commercialization strategies capable of maximizing the value of output per scarce unit of land. In highly land-constrained areas, it should not be surprising to find households shifting out of relatively low-value maize toward horticulture, tobacco, cotton, and niche crops, and then using the revenue to buy their staple food needs. Thus, the trend toward structural maize deficits is not necessarily a bad omen for the region if small farmers can shift into other activities that provide higher incomes. There is evidence to suggest that this is already happening at least for a sub-set of smallholder farmers in the region.

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

Rising land constraints will progressively encourage farmers to shift toward crops providing high returns to scarce land. Because much of Africa is experiencing increased land pressure and limited potential for area expansion, population growth is causing a decline in land/labor ratios and farm sizes are declining. Maize is a relatively low value-to-bulk crop that currently provides high returns to fertilizer application and land in a limited number of areas (e.g., Kenya's North Rift, parts of Southern and Central Provinces in Zambia, and Zimbabwe's Mashonaland maize belt). Given reasonable assumptions about the potential for future productivity gains, it is unlikely that maize will provide the net revenue on the millions of farms that are 0.5-1.0 hectares or smaller to generate substantial income growth, especially in the semi-arid areas.

Therefore, the finding highlighted in this note – that the eastern and southern Africa regions are moving into a structural maize deficit situation – may be a logical consequence of population growth, land pressure, and diversification into other crops. Yet maize productivity growth will remain a crucial objective. If it can be achieved, it will reduce import dependence and remain a source of dynamism and growth for many small farmers in the region. But broad-based improvements in rural livelihoods and incomes will require productivity growth for other crops: oilseed crops, horticulture, animal products, and other food crops such as cassava.

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

REFERENCES:

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

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

Rubey, L., 2004. *How Well-Intentioned Government Actions Exacerbate Food Insecurity: Two Case Studies from Malawi.* Report, USAID/Malawi Agricultural Office, Lilongwe.

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[1] T.S Jayne, A. Chapoto, B. Zulu, S. Haggblade, J. Shawa, H. Haantuba, and J. Shaffer. 2006. Zambia's Maize Value Chain: Toward National and Regional Food Security. Working Paper 20, Food Security Research Project, Lusaka, jointly published by the World Bank and the Rockefeller Foundation.