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## POLICY BRIEF

# EAST AFRICA MAIZE TRADE IMPACTS

## A SYNTHESIS OF FINDINGS

Based on a study written by Paul Guthiga, Stephen Wambugu, Maurice Ogada, Stella Massawe, Joseph Karugia, Hikuepi Katjuongua, and James F. Oehmke

This brief summarizes the results of the East Africa maize trade impact assessment. That study was motivated by an interest in the impacts of two projects: Regional Agricultural Trade Expansions Support (RATES, 2002–08) and Competitiveness and Trade Expansion (COMPETE, 2008–13). Existing evidence showed that RATES and COMPETE actively sought to reduce trade barriers, that trade barriers were in fact reduced, and that the projects had influence among decisionmakers (Chemonics 2008). Prior studies also demonstrated a potential causal pathway from nontariff trade barriers to increased intraregional trade flows to positive welfare impact (Karugia et al. 2009). The

impact study focused on providing empirical evidence on the last stages of that causal pathway, specifically, the associations among increased intraregional trade, smallholder incomes, and urban maize price changes.

Maize is a major food source in the region. Given the existence of maize surplus areas in Uganda and Tanzania and deficit areas in Kenya, the impact assessment focused on maize flows from Tanzania and Uganda into Kenya. The specific objectives of the study were to

1. analyze dynamics of the maize trade flows between Uganda and Kenya and between Tanzania and Kenya,

2. assess the possible impact pathways of cross-border maize trade on the welfare of the various actors and determine the cost-effectiveness of the program in reducing poverty, and
3. analyze key stakeholders' perceptions on how increased maize trade between Kenya and Uganda has impacted their welfare.

Under objective three, emphasis was placed on quantitative measures of or related to household income.

### **RATES AND COMPETE**

The primary role of RATES was to promote intraregional trade in agricultural

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products. It is, so far, the highest profile project charged with promoting and institutionalizing regional trade structures in the agriculture sector (Pannhausen and Untied 2010). RATES-initiated trade structures include the Eastern Africa Grain Council, the African Cotton and Textile Industries Federation, the Eastern and Southern Africa Dairy Association, and the Eastern Africa Fine Coffees Association. RATES developed a simplified customs procedure for small traders, regional market information, a warehouse receipts system, and direct support for more than 2,000 agricultural exporters and manufacturers. RATES promoted "Maize Without Borders," a concept endorsed by heads-of-state throughout the region that freed up cross-border trade in an effort to improve food security (Chemonics 2008).

COMPETE is funded at \$84 million over five years to continue and expand work undertaken by RATES. Its activities include (1) reducing barriers to trade through logistics solutions and improved policy and trade environments, (2) developing value chains by brokering intraregional export contracts and improving production capacity and quality standards, and (3) linking smallholders to commercial staple-foods markets to reduce poverty and, as the key step, enhance regional food security.

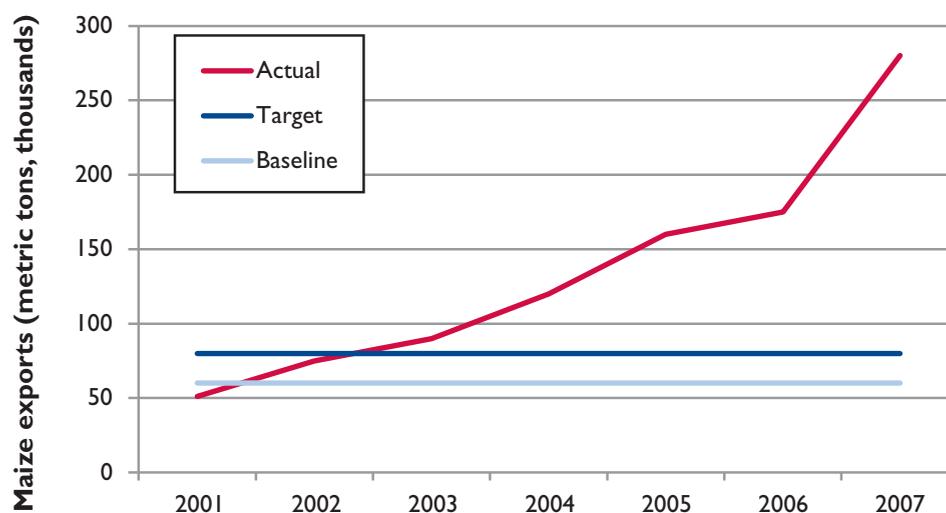
**Causal Pathways.** The short-term pathways through which trade affects household food security and poverty reduction include

- higher prices received by smallholder net sellers, especially in the harvest season;
- lower prices paid and better access to food, especially for smallholder net buyers in the hungry season;
- higher agricultural wages paid by net sellers; and
- greater nonagricultural employment opportunities associated with trade and transport.

Long-term pathways that may take several years to emerge include

- faster economic growth that increases the value of existing smallholder assets and facilitates asset accumulation, and

**FIGURE I—MAIZE EXPORTS FROM SELECTED COUNTRIES**



Source: Chemonics International Inc. 2008.

- increased local expenditure on nonagricultural goods and services that creates nonagricultural business and employment opportunities.

There is ample evidence that maize trade has increased during the RATES and COMPETE operations. Official maize exports from countries in the region exceeded \$200 million in 2007, a more than tenfold increase since 2001, driven mainly by increased volumes (Figure I). Formal maize export volumes from Uganda to Kenya increased from 115,000 metric tons in 2006 to 166,000 metric tons in 2010. Informal maize trade constituted an estimated 83 percent of Ugandan maize exports to Kenya from 2004 to 2006, and anecdotal evidence suggests that informal maize volumes are increasing (Lesser and Moise-Leeman 2009). The total maize flow from Uganda to Kenya was estimated to exceed 250,000 metric tons in 2008 (Karugia et al. 2009).

Evidence on the pathways from increased trade to poverty reduction was not previously available for East African agricultural trade. Preliminary study results—namely, the finding that most formal maize was bound for urban areas—led to the development of the working hypotheses that intraregional maize flows respond to urban price signals, and that they limit urban maize price volatility in times of shortage. The hypothesized price effects are important to the resilience of urban dwellers against poverty, as increases in

staple food prices tend quickly to erode real incomes.

## METHODS

This study employed two main approaches in its research methodology: (1) quantitative analysis of secondary data provided by the Tegemeo Institute of Agricultural Policy and Development and other secondary maize-trade-price datasets and (2) qualitative analysis of information collected during field visits to the Ugandan and Tanzanian borders.

**Quantitative analysis.** A case-comparison approach with difference-in-differences (DiD) quantification of household income was applied. This approach defines a treatment group and a comparison group: households expected to be affected by increased trade and households not expected to be affected, respectively. DiD quantification measures the change in income of treatment households minus the change in income of comparison households. The change in income of comparison households is a representation of nontrade effects on smallholder income. Subtracting the income change of comparison households removes these nontrade effects and therefore DiD quantification isolates the effect of the trade regime shift.

Data on smallholder incomes were taken from the Tegemeo Institute's 2004, 2007, and 2010 representative rural samples. The households in the Tegemeo data

were mapped onto regions of maize surplus and deficit based on historical production and consumption trends. Households in maize-deficit regions in western Kenya were selected as the sample. Based on prior trade literature, households within 10 kilometers of an official trade route constituted the treatment group (n=93), expected to benefit from increased maize trade flows. Sample households between 10 and 50 kilometers of an official trade route constituted the comparison group (n=77), expected to benefit minimally or not at all from increased trade flows.

The study also analyzed urban maize price hypotheses using price data from Nairobi, Kenya; Kampala, Uganda; and Dar es Salaam, Tanzania, along with maize trade data from the Busia border crossing on the Kenya-Uganda border and from the Isebania, Namanga, Holili, and Tarekea border points on the Kenya-Tanzania border. All data are available from the Regional Agricultural Trade Intelligence Network ([www.ratin.net](http://www.ratin.net)). Although estimation of a full-scale trade model and thorough testing of these hypotheses was beyond the scope of the study, analyses provided evidence on co-movements, correlations, and pre-post comparisons of maize prices and trade flows relevant to the hypotheses.

**Qualitative analysis.** The study employed qualitative methods of poverty impact assessment to complement the quantitative analysis of the impact of cross-border maize trade between Uganda and Kenya. A field mission gathered qualitative information from key informants, including maize traders on both sides of the border, transporters, customs officials, officials of statistical bureaus, millers, consumers, representatives of farmers/traders organizations, and others. Interviews were conducted using semistructured questionnaires that elicited information on the role of various stakeholders in the maize trade, perceptions on the historical trends of maize trade, understanding of maize-trade flow patterns, main constraints to trade, and welfare impacts (employment, incomes, maize prices, availability, and production), among other issues. A follow-up field visit gathered additional evidence on working hypotheses developed during the qualitative and quantitative analyses.

## RESULTS

**Rural smallholder income.** The effects of trade on smallholder income were calculated by treatment-comparison analysis. Between 2004 and 2010, treatment-group mean income grew by 19,957 Kenyan shillings (KES) while comparison-group mean income grew by 40,234 KES (Table 1). Despite the higher growth in the comparison group, there were no statistically significant differences (at the 5 percent level) between treatment and comparison groups in any of the analyzed years.

The higher income growth in the comparison group was unanticipated, but subsequent qualitative analysis offered a consistent explanation. Due to the transport of maize in large trucks, there was apparently little impact near large border crossings either on farmgate prices or on rural maize availability. The study did not attempt to track former smallholders who left agriculture for employment in the transport sector. The qualitative analysis suggested that smallholder net consumers of maize near small, unofficial border crossings on *panya* routes were more likely to benefit from increased maize access and lower retail prices.

**Smallholders take advantage of income-generating opportunities.** Qualitative results indicated that inexpensive maize imports across the borders are reducing maize production among communities living near the border points. This finding follows logically from the practice of agricultural diversification, in which farmers diversify their agricultural activities into cash crops. Diversification can increase farm income and ultimately lead to a reduction on smallholder poverty. It is also consistent with smallholders reporting that cross-border

trade has enhanced their household food security.

**Trade-related employment.** The research team observed that people living near the border towns engaged in quite a number of off-farm activities in the adjacent towns of Busia, Isebania, and Migori. Interviews with the key informants and household heads revealed that communities living near the border were employed in a number of trade-related activities and other businesses. Private-sector employment generated by the maize trade includes opportunities as clearing agents; small- and large-scale traders; farmer and trader cooperative officials; maize dryers; small-scale millers; loaders and off-loaders; transporters, including truck drivers; bicyclists, motorcyclists, boat operators, donkey transporters, and hand-cart pushers; weighers and packers; brokers; watchmen; gunny-bag sellers; store renters; retailers; middlemen; market sweepers; and money changers.

**Trade flows respond to prices.** In the short term, it is expected that maize deficits will lead to higher maize prices, and that maize will flow to the food deficit area. For example, if Kenya is experiencing a poor maize crop, then Nairobi prices will be high relative to Dar es Salaam prices, and maize will flow from Tanzania into Kenya. Monthly trade flow data from 2004 to 2009 corroborate the response of trade to price differentials. Sixty-one monthly observations were available. For 12 observations, the Nairobi price was lower than the Dar es Salaam price, and Kenya exported an average of 1,623 metric tons per month to Tanzania. In 58 observations, the Nairobi price was higher, and Kenya imported an average of 8,071 metric tons per month from

**TABLE 1—SMALLHOLDER INCOMES, 2004–10**

| Year | Treatment (n=73) | Comparison (n=85) | t-stat (P-value) |
|------|------------------|-------------------|------------------|
| 2004 | 87,247 KES       | 84,184 KES        | 0.212 (.832)     |
| 2007 | 128,910 KES      | 94,766 KES        | 1.887 (.061)     |
| 2010 | 107,204 KES      | 124,418 KES       | -.915 (.362)     |

Source: Guthiga et al. 2011.

Note: KES = Kenyan shilling.

Tanzania. For one observation, prices were equal, and, ironically, during that month there was no official maize trade.

The correlation coefficient between the Nairobi/Dar es Salaam price ratio and Kenyan maize imports from Tanzania was 0.533 ( $P < .001$ ). The correlation coefficient between the Nairobi/Kampala price ratio and Kenyan maize imports from Uganda was 0.433 ( $P < .001$ ). These correlation coefficients indicate that greater price differentials are associated with higher levels of imports.

**Urban maize prices.** In the long run it is expected that increased trade will narrow the price differential within the region. A simple test of this hypothesis is generated by examining Nairobi maize prices relative to Kampala and Dar es Salaam prices from 2000 to 2005 and 2006 to 2011. In the 2000–05 crop-year period, the Nairobi/Dar es Salaam maize price ratio averaged 1.23; for 2006–11 the ratio averaged 1.19—a decrease of 4 percent. A t-test of the means failed to show that this difference was statistically significant ( $P = .269$ ). From 2000 to 2005 the Nairobi/Kampala price ratio averaged 1.46; from 2006 to 2011 it averaged 1.33—a decrease of almost 9 percent. A t-test shows that the differences in means between the two periods is statistically significant ( $P = .043$ ).

## CONCLUSIONS AND LESSONS LEARNED

The study showed that cross-border maize trade (both official and unofficial) is a vibrant economic activity employing a wide array of actors. Official cross-border trade is responsive to relative urban prices and may be most beneficial to those living in major urban areas by reducing urban maize prices. Unofficial cross-border trade is more beneficial than official trade to consumers living near the border points. Among households near the border, the availability of cheap maize imports leads to the reallocation of smallholder agricultural resources into cash-crop farming and of household labor into off-farm activities. The quantification of poverty reduction from reallocation of smallholder resources is a complex measurement that requires detailed modeling and analysis of the impact of trade on both agricultural and nonagricultural income opportunities and on the ability of smallholders to reallocate resources to engage in more remunerative opportunities.

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