

Trends of food and agricultural input prices in Eastern Africa

Julliet Wanjiku, Lincoln Njagi and Desmond Kirui

This brief analyses the trends of food and input prices in the Eastern Africa region from year to year with 2007 as the base year. The brief provides information on the price changes in food and inputs at country and regional level to facilitate effective policy related decision making.

INTRODUCTION

In the last eight years, Eastern Africa (EA) has had to deal with the challenge of persistently high and volatile food and input prices. Since the 2008 food price crisis, prices of staple foods and inputs in EA have remained high, despite global prices plummeting. Such high and volatile prices are normally not anticipated, as the price variations cause uncertainty reverse of price stabilization among the farmers, traders, consumers and governments. As a result, the aforementioned groups respond differently to the degree of price variations and volatility due to uncertainty: i) consumers adjust their consumption patterns as they are likely to spend a greater portion of their income acquiring the food commodity if prices rise; ii) farmers change their investment decisions which affect their farm income and productivity; and governments devise policy actions to cushion consumers, farmers and traders. The increased volatility in the region's domestic markets can be attributed to a myriad of factors. These include a mismatch between demand and supply in domestic and global markets, and food trade restrictions such as unexpected

export bans which may exacerbate the uncertainty of food movements across markets in the region.

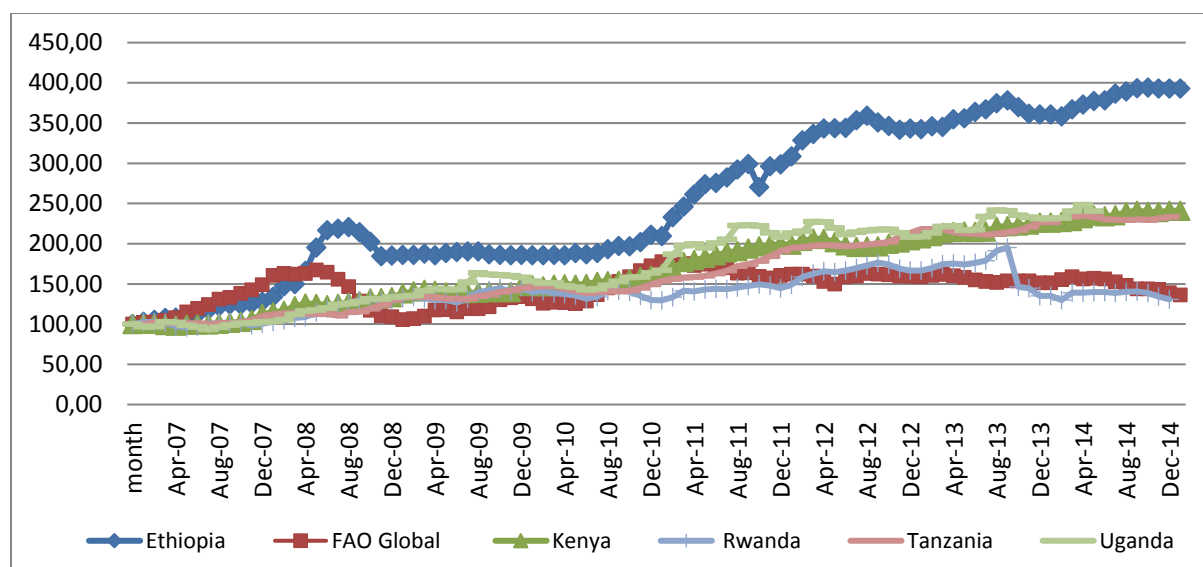
METHODOLOGY

The analysis focused on those EA countries with availability of food prices data. These are Ethiopia, Kenya, Rwanda, Uganda and Tanzania.

The study used the price index which is a measure of relative price changes to compare global and domestic price trends for any two periods and regions. The base year chosen was 2007 because commodity prices started to increase in this year. The Food Price Index (FPI) is the rate of price change of a basket of food commodities bought by households. The FPI reported in this brief was obtained from the statistical offices of the respective countries (not authors' computation). We analysed maize price volatility and maize market integration using the coefficient of variations and maximum likelihood approach respectively.

GLOBAL AND DOMESTIC FOOD PRICE INDICES

After the food crisis (which began in mid-2007), global food prices took a downward trend and continued to decline in some months of 2012 and 2013 (Macharia et al., 2009), while domestic food price index (FPI) has been increasing for the last seven years (Figure 1). Furthermore, Figure 1 shows domestic food prices being volatile from 2007 to 2014.



Sources: Central Statistical Agency Ethiopia (2015); FAO (2015); Central Bank of Kenya (2015); National Institute of Statistics Rwanda (2015); Central Bank of Tanzania (2015); Uganda Bureau of Statistics (2015) (data accessed February 2015).

Figure 1: Global and domestic food price indices (January 2007 = 100)

FPI for the various countries in EA has been increasing rapidly since 2007 to 2013 (Table 1). The highest increases were reported in 2007 and 2008. In addition, a high rate of increase of the food prices among the EA countries was reported in 2011. Tanzania and Uganda reported a higher rate of increase of FPI in 2011 than during the food

price crisis of 2007/2008 which shows almost a repeat of the food price crisis in these countries. Global FPI increased on a declining trend in 2008 and also in 2011 and 2013 (Table 1). This shows that the domestic FPI registered an increasing trend while the global FPI showed a decreasing trend.

Table 1: Percentage changes of FPI

	Jan 2007– Dec 2007	Jan 2008– Dec 2008	Jan 2009– Dec 2009	Jan 2010– Dec 2010	Jan 2011–Dec 2011	Jan 2012–Dec 2012	Jan 2013– Dec 2013
Ethiopia	2.11	3.50	0.06	0.72	3.37	1.21	0.48
Kenya	0.46	1.96	0.47	1.07	1.88	0.15	0.87
Rwanda	-0.11	2.28	0.76	-0.30	0.78	1.15	-0.95
Tanzania	0.42	1.45	1.14	0.19	2.02	1.04	0.50
Uganda	0.17	2.18	1.71	-0.06	2.60	0.03	0.77
GLOBAL	3.29	-1.93	1.59	1.96	-0.45	0.16	-0.32

Source: Authors' calculations based on data from FAO (2015); Ministry of Agriculture Kenya (2015); Central Statistics Agency Ethiopia (2015); RATIN (2015); Uganda Bureau of Statistics (2015) and Central Bank of Tanzania (2015).

PRICES OF MAJOR FOOD COMMODITIES IN EASTERN AFRICA

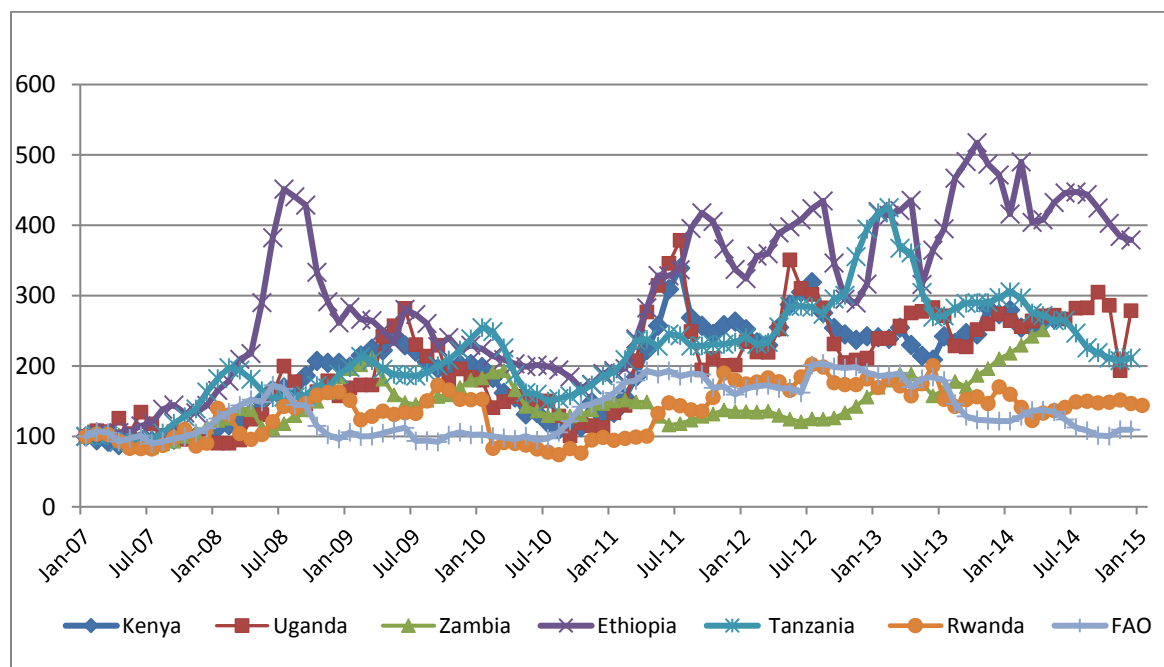
Prices of major food commodities in EA have remained persistently high and volatile since the 2008 food price crisis.

Maize price index

Maize prices in the EA region have continued to rise since the food price crisis in 2008 (Figure 2). Domestic maize prices increased at a rate of approximately 6% in 2008 in Ethiopia, Kenya, Rwanda and Uganda (Table 2). The high rate of increase in maize prices was also noted in 2011

increasing at 5%, 7%, 6% and 7% in Ethiopia, Kenya, Rwanda and Uganda respectively. A decreasing trend in domestic maize prices was reported in 2010. Global maize prices took a downward trend in 2008 increasing at an annual average rate of 1%. In 2013, global maize prices fluctuated at an average annual rate of 3%. Domestic prices in all the other countries of the study were reported to increase rapidly except in Tanzania.

Figure 2 shows the volatility of maize prices in the EA region.



Sources: Central Statistical Agency Ethiopia (2015); FAO (2015); Central Bank of Kenya (2015); National Institute of Statistics Rwanda (2015); Central Bank of Tanzania (2015); Uganda Bureau of Statistics (2015) (data accessed February 2015).

Figure 2: Maize price indices (January 2007 = 100).

Table 2: Maize price percentage changes

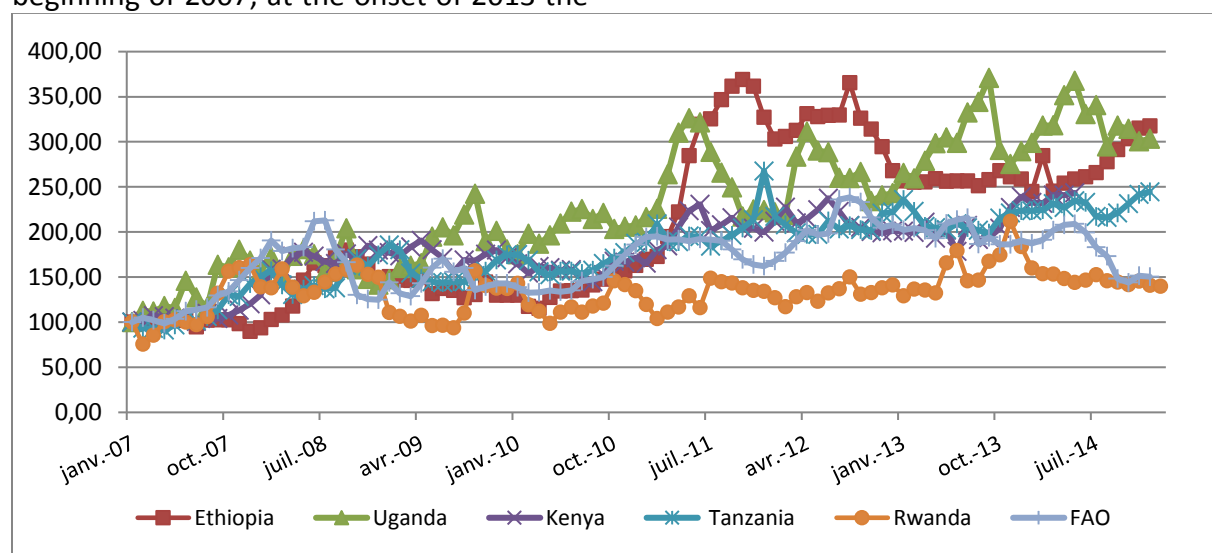
	Jan 2007- Dec 2007	Jan 2008- Dec 2008	Jan 2009- Dec 2009	Jan 2010- Dec 2010	Jan 2011- Dec 2011	Jan 2012- Dec 2012	Jan 2013- April 2013
Ethiopia	3.52	6.42	-0.73	-1.49	5.40	-0.11	4.35
Kenya	0.03	6.30	0.04	-3.15	6.96	-0.41	1.32
Rwanda	-0.39	6.36	-0.19	-1.95	5.69	0.28	0.09
Tanzania	4.81	1.46	2.07	-1.72	2.04	4.66	-2.07
Uganda	0.14	5.64	2.35	-2.46	7.05	1.40	2.46
GLOBAL	1.24	-0.66	0.76	3.58	0.54	1.73	-3.43

Sources: Authors' calculations based on data from FAO (2015); Ministry of Agriculture Kenya (2015); Central Statistics Agency Ethiopia (2015); RATIN (2015); Uganda Bureau of Statistics (2015) and Central Bank of Tanzania (2015) (data accessed August 2015).

Beans price index

Kenya and Tanzania have had similar increasing trends in relation to bean prices since the food price crisis in 2008. In 2013 rising prices were recorded in Kenya, Uganda, Rwanda and Tanzania. As shown in Figure 3, Ethiopia had high prices since the beginning of 2007; at the onset of 2013 the

country had reduced the level of bean price rate of change, showing a declining trend. However, in the first quarter of 2014 bean prices started taking an upward trend in all EA countries except Rwanda whose bean prices took a downward trend (Figure 3).

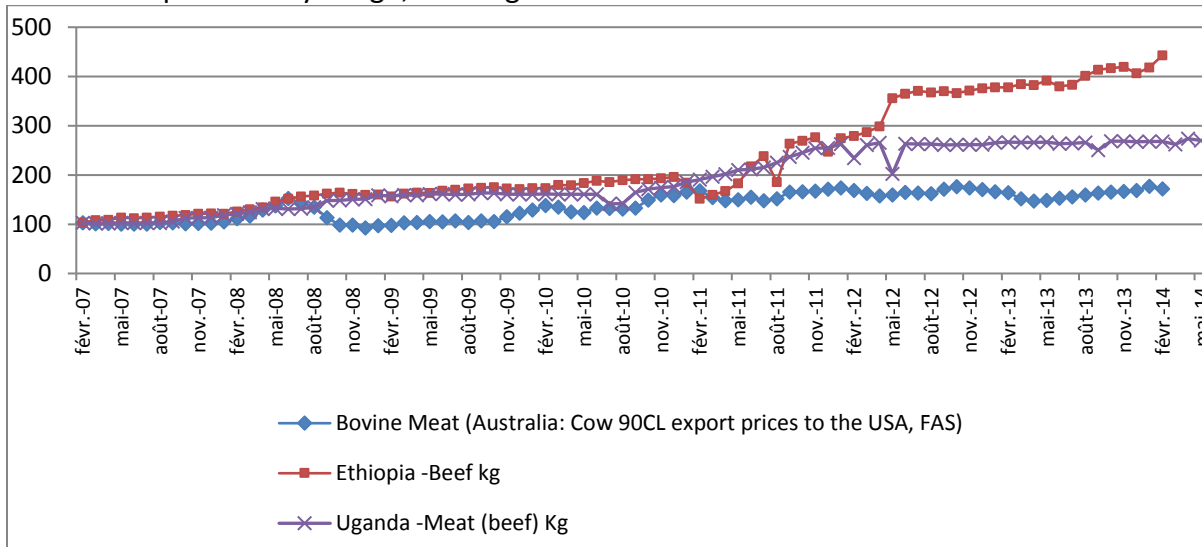


Sources: FAO (2015); Ministry of Agriculture Kenya (2015); Central Statistics Agency Ethiopia (2015); RATIN (2015); Uganda Bureau of Statistics (2015); Central Bank of Tanzania (2015) (data accessed February 2015).

Figure 3: Bean price indices (January 2007 = 100).

The prices of livestock products among countries in EA followed a similar trend to that of most food commodities and remained persistently high, taking an

upward trend from 2007 to early 2014 (Figure 4). Few data on price are available in EA for livestock products.



Sources: FAO (2014); Central Statistics Agency Ethiopia (2014); Uganda Bureau of Statistics (2014) (data accessed June 2014).

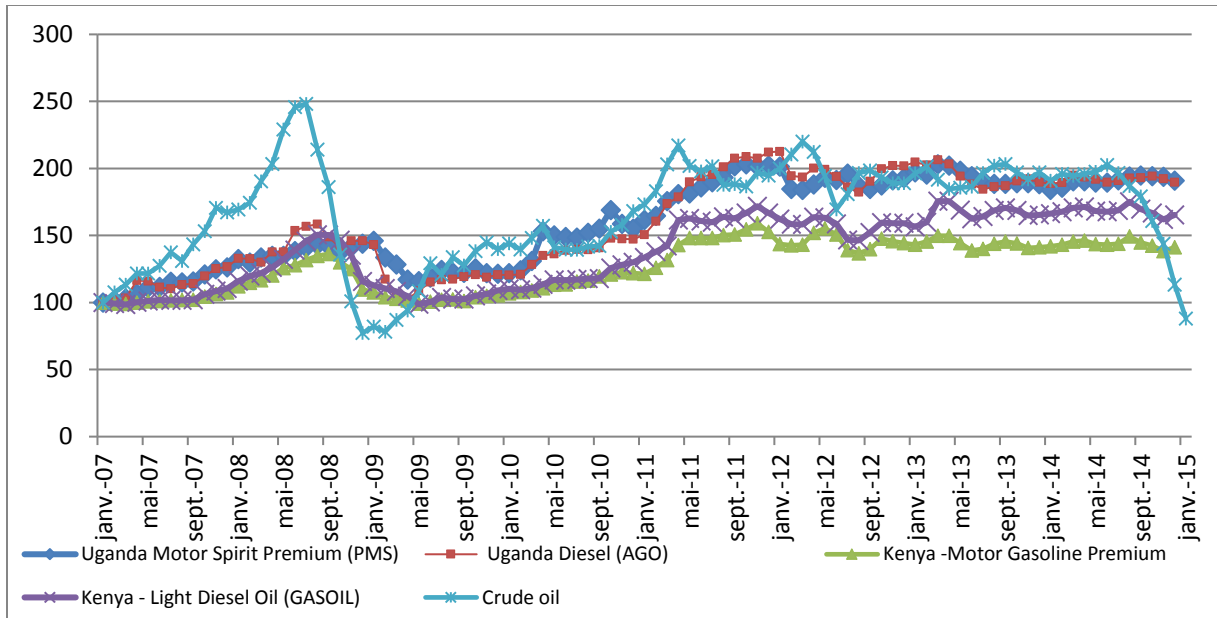
Figure 4: Beef price indices (January 2007 = 100).

Prices of selected inputs in EA region

Fuel price index

High diesel prices increase farm production and transportation costs, consequently increasing the food prices. Figure 5 shows that the diesel price trends within the EA region trail those of world crude oil since almost all petroleum products in the region are imported. While domestic fuel prices remained stable in Kenya and Uganda in

2009, they increased thereafter in 2010 and 2011. During 2013 domestic and world fuel prices took a downward trend, but in the first quarter of 2014 it had an upward trend (Figure 5). Fuel price data are also scarce among the countries of study in the region.



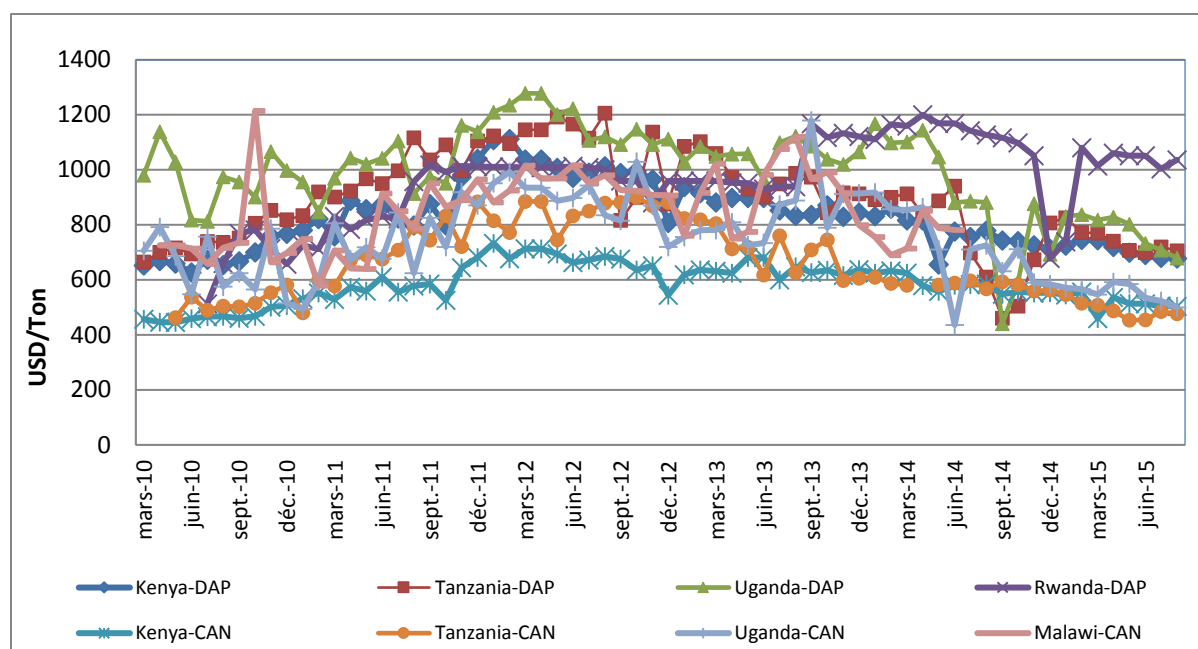
Sources: Kenya National Bureau of Statistics (2015); Uganda National Bureau of Statistics (2015); World Bank (2015) (data accessed February 2015).

Figure 5: Fuel price indices (January 2007 = 100).

Fertilizer prices in selected countries in EA

Fertilizer prices have been relatively volatile since 2010 among the selected countries in the region (Figure 6). The prices took an upward trend in 2011 and a downward trend in 2013. As the cost of inputs increases, so do food prices. High fertilizer

price volatility causes increased food price volatility as the prices of fertilizer affects the cost of production, consequently affecting the stability of food supply.



Source: AMITSA (2015) (data accessed January 2015).

Figure 6: Average retail fertilizer price (USD/ton).

FOOD PRICE VOLATILITY

Table 3 shows maize price volatility as measured by the coefficient of variation in selected EA countries. Domestic food prices, except in Rwanda, were much more volatile than the corresponding global prices. The results imply that global markets have not influenced maize price volatility in EA and suggest that domestic factors play a major role in maize price volatility. The high volatility of the prices in domestic markets may be caused by many factors including policy changes and difference between domestic supply and demand. Food trade restrictions such as export bans may cause increases in commodity prices and volatility (Badiane et al., 2014). Changes in trade policy increase the uncertainties of maize grain movements between markets in the EA region. Between 2007 and 2012 Kenya,

Ethiopia, Rwanda and Tanzania imposed export bans on maize. With the imposition of export bans, domestic prices are expected to increase due to shortfalls in supply which in turn also reduce domestic demands. Export bans widen the gap between domestic marketed supply and demand, leading to higher prices. Ad hoc implementation of export bans and also import restrictions in importing countries has an effect on price volatility. Furthermore, export bans may have failed among the EA countries due to existence of substantial informal cross-border trade. Export bans increase transaction costs through informal trade routes. Jayne et al. (2005) reported that export bans increase consumer prices and smuggling costs in addition to lowering producer prices. Management of national stocks may also cause food price volatility. Ideally, stocks

should be accumulated during periods of excess supply and released in times of excess demand. However, the management of national stocks, such as the case in Kenya by the National Cereals and Produce Board (NCPB), has been associated with market uncertainties that contribute to an increase in commodity price, especially among the large traders (Jayne and Nyoro, 2006; Ariga et al., 2010), leading to price volatility. Lack

of transparency has been reported in the operations of NCPB (Curtis, 2014). Ethiopia, Rwanda and Tanzania also operate state controlled marketing boards. This may be the cause of the observed volatility in Table 3.

Political instability may destabilize food supply, affecting food price stabilization as in the case of Kenya in 2008 (Benson et al., 2008).

Table 3: Volatility of global and domestic maize prices (January 2007 to December 2013)

Countries	Coefficient of variation (%)
Ethiopia	39
Uganda	36
Kenya	34
Tanzania	34
Rwanda	27
FAO Global	27

Sources: Authors' calculations based on data from: FAO (2014); Ministry of Agriculture Kenya (2014); Central Statistics Agency Ethiopia (2014); RATIN (2014); Uganda Bureau of Statistics (2014); Central Bank of Tanzania (2014) (data accessed June 2014).

MAIZE MARKET RELATIONSHIPS

Strengthening markets in the EA region is important in achieving food security. When markets (global and domestic) are integrated: food flows from surplus to deficit areas, consumers purchase items at lower prices, and traders and producers make profit selling items at higher prices. This implies that foreign factors are likely to affect domestic markets. This means that when global prices take a downward trend, the same is expected of domestic maize

prices. Figure 7 shows that the domestic and global maize markets are weakly integrated. This indicates that the markets are unconnected by actual movements of maize from one market to another showing no domestic and global relationship in maize prices. Therefore foreign factors may not affect domestic maize prices. This actually supports earlier findings by Macharia et al. (2009) that global food prices declined after the food price crisis while domestic food prices continued to increase.

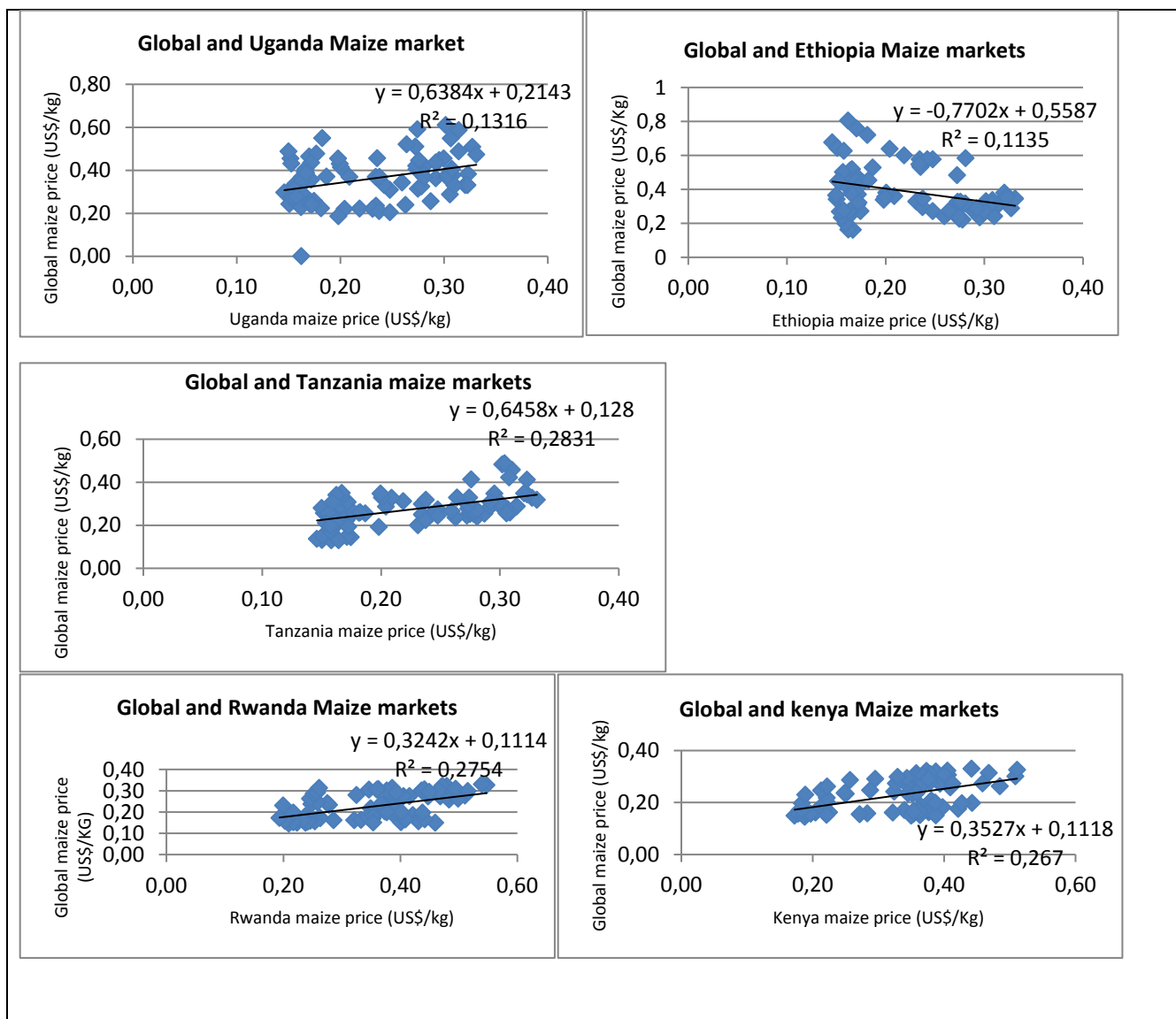


Figure 7: Maize price linkages between global and domestic markets, January 2007 to December 2013.

Sources: Authors own computation based on data from Central Statistical Agency Ethiopia (2015); FAO (2015); Central Bank of Kenya (2015); National Institute of Statistics Rwanda (2015); Central Bank of Tanzania (2015); Uganda Bureau of Statistics (2015) (data accessed February 2015).

The data in Table 4 were generated using co-integration analysis which adopts a maximum likelihood approach to show the

price transmission effect among the various domestic markets using the Johansen test (Johansen, 1991). The analysis evaluates

whether price movements in the independent market cause price movements in the dependent market. The data in Table 4 add value to results in Figure 7 by analysing price transmission effect among the various domestic markets and the price transmission effect among the domestic markets and global market. The results of this test, reported in Table 4, show that maize prices are transmitted across the various domestic markets in the region. The domestic prices correlate with each other in the region than with world prices. Kenya maize prices are correlated with those in Tanzania and Uganda. Uganda maize prices are transmitted to Kenya and Rwanda. Positive transmission means the maize prices in the two markets move in

the same direction, when prices in the dependent market increase, they cause an increase in the independent market showing a linear relationship. Prices in the independent market respond to any increase in prices within the dependent market in the same direction; prices also increase. If prices in the independent market decrease, the dependent market price decreases too. Uganda maize prices are transmitted to Kenya with a higher magnitude than the price transmission of Kenya prices to Uganda. This can be explained by the fact that Kenya is an importer of maize and Uganda is an exporter of maize in the region, thus the greater transmission magnitude.

Table 4: Co-integration analysis between domestic and global maize prices (January 2008 to December 2013).

Dependent markets	Independent markets					
	Kenya	Uganda	Tanzania	Ethiopia	Rwanda	Global
Kenya	1	0.871(3.26)***	0.176(2.04)**	0.007(0.06)	-0.0001(-0.38)	0.062(0.87)
Uganda	0.139(3.26)**	1	-0.0311(-0.88)	0.030(0.67)	0.0003(3.03)**	0.010(0.35)
Tanzania	0.292(2.04)*	-0.323(-0.88)	1	0.052(0.36)	0.0004(0.1)	-0.051(-0.55)
Ethiopia	0.008(0.06)	0.196(0.67)	0.0327(0.36)	1	-0.001(-0.53)	-0.028(-0.39)
Rwanda	-17.421(-0.38)	331.311(3.03)**	3.650(0.1)	-23.940(-0.53)	1	23.965(0.83)
Global	0.158(0.87)	0.160(0.35)	-0.078(-0.55)	-0.069(-0.39)	0.00037(0.83)	1

Note: In parentheses are t ratios, *** and ** indicate significance at 1% and 5% level respectively.

Data sources: Central Statistical Agency Ethiopia (2014); FAO (2014); Ministry of Agriculture Kenya, (2014); RATIN (2014); Central Bank of Tanzania (2014); Uganda Bureau of Statistics (2014) (data accessed June 2014).

CONCLUSION

Domestic food prices in the EA region have remained persistently high and volatile despite the global downward trend. This confirms earlier results from Karugia et al. (2010) and Minot (2010).

The study concludes that while domestic maize markets show a degree of integration among themselves, they are not integrated to global maize markets. The pattern of price changes shows that prices in one country in EA are likely to be affected by prices in neighbouring countries. This indicates great potential for intra-regional trade by movement of food commodities from surplus countries to deficit areas. The intra-regional trade enables producers to take advantage of the high prices in deficit

areas while consumers can take advantage of low prices in surplus areas.

Moreover, the study results imply that global markets have not influenced prices in domestic markets in EA region.

Therefore domestic policies are important in addressing the challenge of high and volatile food prices in EA. This study did not empirically look at the factors causing high and volatile food prices in the region. The information on the factors would be used to further inform policy decisions. There is therefore need for further study to provide evidence on the main factors contributing to persistently high and volatile food prices despite the various policy actions undertaken by various governments in the region. Further studies can also analyse the effect of food and trade policies on market integration.

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Coordinator

Regional Strategic Analysis and Knowledge Support System, East and Central Africa (ReSAKSS-ECA)

P.O. Box 30709

Nairobi, Kenya

Telephone: +254 (20) 422 3000

Facsimile:

Email: resakss-eca@cgiar.org

www.eca.resakss.org