Fuel and food prices: key findings from focus group discussions and structured interviews in Tanzania
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I. Introduction

In August 2012, Cornell University teamed up with the International Growth Centre in Tanzania to study the impact of fuel and food prices on food security through a series of focus group discussions and structured interviews in several urban markets and rural areas around the country. Five qualitative survey instruments were developed to better understand the exchanges among different market actors along the supply chain of maize, a primary staple crop. Furthermore, the interviews and discussions sought to examine rural and urban household-level impacts and coping strategies in response to food and fuel price increases. The qualitative surveys consisted of village-level focus group discussions (FGDs) and structured interviews with rural and urban traders, millers, urban households and transporters.

Because of the qualitative nature of this study, the results discussed below should not be interpreted in terms of statistical significance nor are they generalizable to all of Tanzania. Rather, the qualitative methods employed are a useful first step to develop a set of hypotheses that can subsequently be rigorously examined by other methods, such as household surveys.

Nonetheless, several important findings emanate from this qualitative study. Maize is a staple food consumed by most Tanzanian households, so that increases in the price of maize cause households to make adjustments that still allow them to consume maize daily. Coping mechanisms include finding additional sources of revenue, skipping meals, eating less and/or substituting maize with other crops. Households depend on kerosene, charcoal and firewood for fuel. Increases in prices of these goods cause households to reduce consumption and/or look for additional sources of revenue and/or substitute one energy source with a cheaper one, e.g., substituting charcoal with firewood. Increases in prices of other energy sources affect households indirectly, by increasing the costs of transporting goods to local markets and increasing the manufacturing costs associated with producing certain goods (e.g., sugar, salt, tea). While traders in rural areas may absorb small price increases, price increases for both maize and fuel products are generally passed on directly to consumers.

The following paper begins by examining previous studies that used qualitative methods to examine the effects of food and fuel price changes in Africa. We then describe the methodology used, summarizing the instruments we developed. We then describe the seasonal calendar for maize in the five regions studied and then sketch the maize supply chain in Tanzania as understood through discussions with traders, transporters and shopkeepers. We then describe the results from the discussions and
interviews regarding recent fuel and food price trends. We end by examining how the different actors along the supply chain respond to changes in food and fuel prices.

II. Background

Several studies and reports examine the effect of fuel and food price increases through quantitative methods, including household surveys and macroeconomic simulations and tools (Kpodar, 2006; Ivanic and Martin, 2008; Simler, 2011; Arndt, 2013). However, we found few studies using qualitative methods that examine these questions. Qualitative methods allow the researcher to explore potential causes or explanations of phenomena that structured surveys do not. For example, open-ended questions commonly used in FGDs allow participants to freely discuss certain issues that pre-coded survey questions do not allow. To date we have found only three studies that discuss the use of FGDs to elicit answers to some key questions surrounding food and fuel price volatility and household coping mechanisms.

Aliber and Modiselle (2002) prepared a report for the National Department of Agriculture of South Africa to recommend monitoring methods for impact assessments of food price changes that could be undertaken on a regular basis. The authors propose and examine three different tools – household surveys, focus group interviews and data collection from shops. They find that the results from the FGDs confirmed the findings from the surveys, despite some difficulties they experienced of encouraging participation of women in mixed FGDs. The authors find that high food prices tended to force households to reduce the number of meals per day they ate and/or opt for lower quality foods, forcing households to purchase brands of dubious quality.

A joint UN survey (among the FAO, UNDP, UNICEF, WFP and UNMIL) conducted a rapid assessment of the impact of rising food prices of household food insecurity in Liberia in 2008 using 266 household surveys in 8 areas of Greater Monrovia, focus groups and interviews. FGDs by gender took place in rural areas to examine the effect of price shocks on different livelihood groups (rice producers, tree crop producers, palm oil producers, charcoal producers, rubber tappers, cassava producers, hunters, fishers and gold miners). The discussion comprised of open-ended questions aimed at understanding the causes, trends, responses and coping strategies of price shocks. Interviews were also conducted with traders and other key informants in Monrovia and urban centers across the country.

By use of secondary data and FGDs, Ngetich et al. (2009) examine the demand for fuel and food in the Nakuru district in Kenya. They study the demand and supply of biomass fuel, including wood, agricultural residues (e.g., maize cobs or maize straw), charcoal or dry cow dung, used for cooking, lighting and heating. They look at how households make the competing decision between cultivating food or biomass for fuel. They find that the majority of households opt to grow crops for food and resort to the market to buy fuel products like charcoal.
III. Tanzania: A snapshot

Tanzania is a low-income country with a population of about 46 million people and a GDP per capita of USD 532. The economy has enjoyed a 7 percent average annual growth rate in the past 10 years with the service industry being the main driver of growth. While a large share of its total GDP comes from the service industry (47 percent), followed by the agriculture sector (28 percent), 75 percent of its workforce is employed in the agriculture sector and live in rural areas (WDI, Moyo et al., 2010).

The country is committed to investing in its agriculture sector since three quarters of its population rely on it. In 2009, the government launched the “KILIMO KWANZA” initiative to help speed up agricultural growth (Hon. J.M Kikwete, 2009). This initiative included expanding fertilizer subsidy program to 53 districts in 2008. Other initiatives include the formation of the Agricultural Seed Agency (ASA website) and improving linkages between agriculture research and training institutions.

The main sources of energy in the country are petrol, hydropower, coal and biomass. Most electricity consumed is produced domestically though a few remote regions are supplied by Uganda or Zambia. A very small proportion (approximately 14 percent) of the country's inhabitants actually have access to electricity. Therefore, the most common residential sources of energy are firewood, charcoal and kerosene (CTI, 2009).

IV. Research Methodology

Focus group discussions and interviews were conducted in five regions in Tanzania, -- Mbeya, Kigoma, Arusha, Dodoma and Dar es Salaam (Figure 1). These regions were chosen to coincide with the regions studied in the spatial price analysis study (Dillon and Barrett, 2013), which is also a part of this project. They are either major food producing regions, trade centers or both. Mbeya, Kigoma, Arusha and Dodoma are among the top staple food producers of maize, rice and beans. In particular, Kigoma and Mbeya are surplus-maize production regions, supplying maize to much of the rest of the country. Dar es Salaam is the most connected and dynamic crop trading center in the country.

Within each region, one village lying in a major maize producing district was selected for a detailed focus group discussion with farmers and interviews with shopkeepers and mill owners. In the regional capital cities, interviews were conducted with urban households, traders and transporters. Village selection and maize market/trade center identification was done upon arrival in the region with the assistance of a local expert. At the regional level, either the regional planning commissioner or the regional agricultural coordinator assisted us, while at the village level, either the village chairman or the village secretary assisted us. Local market and ten-cell...
leaders\(^1\) helped us select traders, middlemen and urban households in the regional capital.

<table>
<thead>
<tr>
<th>No</th>
<th>Region</th>
<th>District</th>
<th>Rural village</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mbeya</td>
<td>Mbozi</td>
<td>Itaka</td>
</tr>
<tr>
<td>2</td>
<td>Kigoma</td>
<td>Kigoma Rural</td>
<td>Kandaga</td>
</tr>
<tr>
<td>3</td>
<td>Arusha</td>
<td>Meru</td>
<td>King’ori</td>
</tr>
<tr>
<td>4</td>
<td>Dodoma</td>
<td>Kongwa</td>
<td>Mkoka</td>
</tr>
<tr>
<td>5</td>
<td>Dar es Salaam</td>
<td>Temeke</td>
<td>Yaleyle Puna</td>
</tr>
</tbody>
</table>

Table 1. Participating villages

\(^1\) Tanzania introduced the cell system in 1965 while reforming its political administration. A ten-cell leader was democratically elected to oversee ten families/households. The ten-cell leadership position was an official administrative position during the one party system but was no longer official after the country moved to a multiparty system. Nevertheless, the cell system still exists.
Appendix 1 includes full details on the sampling strategy implemented for each instrument. Appendices 2-6 include the final instruments for each discussion and interview. The main questions raised in the instruments are summarized briefly below.

- **Rural focus group discussions**: A group of 8-10 farmers were randomly selected to participate in the FGDs. Participants filled out a seasonal calendar to better understand village-level rainfall patterns, crops farmed, and general farming practices including the use of inorganic fertilizers. Participants were also asked questions about the availability and consumption of food and fuel goods commonly consumed, as well as their prices. The second part of the discussion consisted of open-ended questions aimed at understanding household coping mechanisms to increases in crop and energy prices.

- **Rural shopkeepers/vendors**: This questionnaire was administered to rural kiosk owners who sold grains and/or fuel products. The questions were designed to collect information on the distance travelled to source markets and the availability of the goods sold in a typical year. They were also asked about recent
fuel price trends and the effect of price changes on the prices charged to consumers.

- **Rural millers:** This questionnaire aimed to collect information on the costs and demand for milling cereals. Questions asked specifically about the energy types used, their availability and recent price changes.

- **Urban traders/transporters:** This questionnaire asked middlemen and transporters questions on the maize trade between rural and urban or semi-urban areas. It sought to understand typical annual maize and fuel price changes, recent price fluctuations, determinants of chosen trade routes and the prices charged to buyers and sellers.

- **Urban household questionnaire:** This questionnaire aimed to better understand the food and fuel sources typically consumed by urban households, as well as their annual price and availability fluctuations. Households were also asked how they might cope with such fluctuations.

V. **Agricultural Calendar**

a. **Crops grown**

FGD respondents in all regions were asked to rank the three crops most produced in their area (in terms of land allocated to growing those crops). Figure 2 shows the frequency of the crops cited by FGD participants in each region. Maize, coffee, beans and cassava were the most commonly cited crops, with maize being grown in each region (as expected, given our sampling strategy). Maize was the most commonly grown crop in all regions except for Kigoma, where maize was second to cassava. This result is consistent with field observations that cassava is generally more commonly grown and consumed in this region than in other regions in Tanzania.
On average, 33 percent of a Tanzanian’s caloric intake comes from maize and 31 percent of Tanzania’s staple food production is maize (USAID, 2010). Maize in Tanzania is most often consumed as *ugali*, a doughy substance accompanied by vegetables and possibly beans or meat. As discussed below, even when maize prices rise, households will adopt coping mechanisms to consume maize at least once per day. Because of the critical role of maize in most Tanzanian households, this report focuses specifically on maize production, trade and prices and its interaction with fuel prices.

### b. Seasonal Calendar

Each FGD discussion began with participants describing the seasonal calendar in a typical year for maize in their region. Agricultural activities are quite similar across regions. Figure 3 shows the agricultural calendars by region. Planting activities are usually between November and January while harvests are usually between May and September. All regions have one major planting and harvesting season with the exception of Arusha. Arusha, which is at a higher elevation, has two planting seasons with the major harvest occurring between July and September. All FGD participants reported depending on rainfall for farming. Therefore, as discussed below, small fluctuations in rainfall can have large consequences on yields. There are generally two main rainfall seasons, heavy rains from February to April and lighter rains between November and January. The dry season is between May and September. Figure 4 shows the number of regions experiencing rainfall by month.
Figure 3. Typical seasonal calendars, by region

Legend:
- Blue: Rain
- Green: Planting
- Orange: Weeding
- Red: Harvesting

Figure 4. Typical regional rainfall patterns
c. **Purchasing and Selling Maize**

FGD participants were also asked to describe their buying and selling patterns for maize. As can be seen from Figure 5, peak sales in the regions examined range between May and August, with some regions also selling between September and November. Figure 5 also displays the aggregated regions’ harvesting months, showing that harvesting months tend to coincide with maize sales.

During the FGDs, we asked participants whether they noticed any differences in the quality of maize they grow themselves versus the maize they buy back during the lean season. Respondents reported noticing obvious differences in smell and taste. The maize purchased during the lean season would smell of chemicals, unless they were preserved using local methods such as covering maize with ash. Respondents also noted that the purchased maize tasted less fresh than their own.

![Maize monthly harvesting and sales](image)

**Figure 5. Maize harvesting and selling months**

**d. Inorganic fertilizer use**

The government of Tanzania introduced the National Agriculture Input Voucher Scheme (NAIVS) in two districts in 2007. The program targeted maize and rice producers and was planned for three years. Each farmer was scheduled to receive (i) one bag of urea (32-33 kilograms); (ii) one bag of di-ammonium phosphate (DAP) (23.3 kilograms) or two bags of Minjungu Rock Phosphate (MRP) with a nitrogen supplement (25 kilograms); and (iii) 10 kg of hybrid or OPV maize seeds or 16 kg of rice seeds. These quantities are sufficient to be applied to a 0.5 hectare plot of maize or rice. The government later scaled up the program to 53 districts in 2008 and 57 districts in 2009-2011 (Minot, 2009; DANIDA, 2011-2012; World Bank, 2009).

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2 The farmer could select one of the two packages offered: a) 1 bag of urea (32 kg), 1 bag of DAP (23.3kg) and 10 kg of seeds; or b) 1 bag of urea (33kg) and 2 bags of MRP (25kg).
Many farmers reported having received government fertilizer subsidies for DAP and urea during the past three years. However, in the past two years, they could not apply fertilizer because the vouchers to claim the subsidies had arrived too late. Most farmers remarked that when they applied fertilizer, it resulted in significant yield increases except for participants in Dodoma, for whom fertilizer application caused their maize to dry before it had fully matured. They believed this occurred because their soil type is different than most regions in Tanzania. The participants reported that the quantity they received from the government was sufficient to farm approximately one acre of land.

FGD participants explained that a committee composed of representatives from each sub-village selected three hundred recipients per village. The recipients received vouchers to claim the fertilizers from specific suppliers. Suppliers had lists of recipients and would only distribute fertilizers if a claimant appeared on their list except in Arusha where a voucher could be claimed by a relative of the original recipient. Because the government only subsidized 40% for the planting fertilizer and 50% for the growth fertilizer, many recipients did not claim the subsidies as they could not afford the remaining cost.

VI. Maize Supply Chain

Conversations with maize transporters and traders in urban markets revealed that maize trade occurs primarily in three main locations: at the village level, in semi-urban or urban district capital markets (which we refer to here as small and middle-sized markets, respectively) and in larger urban or city markets (large markets, primarily Dar es Salaam). Trade activities occur between farmers, middlemen (who facilitate linking a buyer with a seller in exchange for a small fee from both parties), traders (purchasers of maize) and transporters. Traders may use their own vehicles to transport the maize but in most cases hire independent drivers who own trucks to transport their purchased goods from one market to another. A farmer can sell his/her maize to outside buyers through three main mechanisms – through an auction where multiple traders compete with each other for farmers’ maize in the village center, through one-on-one interactions between traders and farmers, or through middlemen who link traders with farmers. Farmers tend to favor selling through middlemen, unless they have prior contact with specific traders that they deem trustworthy.

While middlemen may or may not link farmers with small or middle-sized market traders, traders servicing the large market of Dar es Salaam are required to buy and sell their maize through middlemen. In fact, conversations with middlemen in Dar es Salaam revealed that they are organized and registered in a union and have identification cards. If traders experience any problems with middlemen, they may
file official complaints with the union and middlemen risk losing their network of traders. Because the trade of maize entails risks for both the seller and the buyer, middlemen act as a safety net to both parties. Middlemen tend to specialize in one market so they can screen producers and buyers and ensure both parties come through on their commitments. Figure 6 shows these exchanges just described through a diagram (black arrows represent exchanges exclusively facilitated by middlemen whereas white arrow represent exchanges potentially but not necessarily facilitated by middlemen).

In rural areas, middlemen or traders usually set prices while in urban areas market prices are well known by all parties, so that the prevailing market price dictates the price individual traders charge. In urban areas middlemen get a fixed amount of TZS 5 from the seller and TZS 5 from the buyer for each kilogram of maize traded, totaling TZS 10 (~0.006 USD per kilogram) independent of the price at which maize is traded.

Figure 6. Maize supply chain

**VII. Maize Prices**

As discussed above, farmers tend to plant between November and January when the shallow rains begin. Nearly all focus group participants reported selling the majority of their maize between May and September, paralleling the harvesting months. Figure 7 shows the average recall retail market price for maize by FGD participants during the 2011-2012 growing season (TZS/kg). Maize prices peak just before the harvest and drop during the harvest period. Maize prices in the lean season reach nearly double those during the harvest season. These prices fall within the range of secondary price data (Bank of Tanzania, 2012).
Interviewed traders in Dar es Salaam explained that in large markets, maize grown without fertilizer is actually sold at a higher price due to its higher quality and better taste. For example, traders in Dar es Salaam pay more for maize grown in Dodoma (because they do not use fertilizer), which is used to make maize flour. Maize grown using fertilizer is more likely to be sold and used as animal feed.

The focus group discussants expressed that maize prices had increased steadily in the past two years. In a more typical year, such as in 2010-2011, maize prices tended to decrease after the harvest season. In 2012, however, prices had not decreased as much as before during the harvest period. This finding is corroborated with secondary data showing that wholesale prices of main food crops increased between 2011 and 2012 (Figure 8). Maize prices increased by 19.8 percent between August 2011 and August 2012 (Bank of Tanzania, 2012).
When asked about possible reasons behind the general price increase of maize, respondents gave the following responses:

a. **Lower than average rainfall.** Participants reported lower than average rainfall in 2011-2012. In addition, they reported a late start of the planting rains coupled with an inconsistent rainfall pattern resulting in crop losses for farmers who planned on time. These results are consistent with secondary data showing lower than average rainfall during the March-May 2012 in all regions studied except for Dodoma, as shown in the table below (Tanzania Meteorological Agency (TMA), 2012).

<table>
<thead>
<tr>
<th>Region</th>
<th>Average rainfall: March-May 2012</th>
<th>% of average3 rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kigoma</td>
<td>199.1 mm</td>
<td>59.1%</td>
</tr>
<tr>
<td>Mbeya</td>
<td>150.0 mm</td>
<td>50.4%</td>
</tr>
<tr>
<td>Dodoma</td>
<td>202.8 mm</td>
<td>114.6%</td>
</tr>
<tr>
<td>Arusha</td>
<td>298.7 mm</td>
<td>68.4%</td>
</tr>
<tr>
<td>Dar es Salaam</td>
<td>422.6 mm</td>
<td>71.6%</td>
</tr>
</tbody>
</table>

*Source: Tanzania Meteorological Agency (TMA, 2012)*

Table 2. March – May 2012 rainfall by region

b. **Delayed distribution of fertilizer subsidies.** As previously discussed, the government of Tanzania has been distributing fertilizer subsidies for the past three years in an effort to increase agricultural productivity. Four out of the five regions surveyed depend on inorganic fertilizers for higher maize yields. However, in 2011 and 2012, fertilizer subsidies did not reach farmers in time for planting. While the planting season is between November and January and can be extended at most to February, fertilizer subsidy vouchers only reached

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3 Rainfall amounts below 75% of long-term averages are categorized as below normal, 75% to 125% as normal and greater than 125% of long-term averages are categorized as above normal. Average rainfall is the mean rainfall calculated over all the preceding years for which data are available. Unfortunately, TMA does not specify their data span.
farmers in March in all regions except Dodoma. Because farmers expressed that higher yields usually resulted from fertilizer application, we asked them why they had not purchased fertilizers when the vouchers did not arrive. They reported both not being able to afford the full price of industrial fertilizers and also constantly expecting that the fertilizer vouchers would arrive imminently. A few farmers did report applying urea, but still the overall maize production was lower than usual. Farmers did not know of anyone in their village who bought fertilizer at full price.

c. **Increased costs of farm inputs:** FGD respondents in all areas reported a general increase in prices of goods including farm inputs such as farm equipment, labor and packaging materials, e.g., 25 kg plastic bags used to transport maize. Some respondents reported a general increase in the price of manufactured goods, e.g., soap, sugar and salt, and transport costs due, they presumed, to an increase in oil taxes. An increase in fuel prices increases the prices of these goods, due to both the increase in transportation costs and also the increased cost of manufacturing, for those goods produced within Tanzania, i.e., soap, tea, and sugar. The resulting general increase in the cost of living has resulted in a higher wage for employing farm labor, making it more costly to hire labor, needed especially during the weeding season.

These observations are consistent with the reported annual consumer price index which increased from 7.19 in 2010 to 15.65 in 2012 in Tanzania (IMF, 2012). In addition, the annual percentage change in inflation food and energy prices in October 2012 was 14.9 and 18.4 percent, respectively, as seen in Table 3 (Bank of Tanzania, 2012).
d. **Increased demand for food crops**: FGD respondents, traders and transporters reported an increase in demand for food crops in 2012 especially from neighboring countries like Kenya and the Democratic Republic of Congo. Indeed, maize reserve stocks held by the government of Tanzania decreased in 2012 (Bank of Tanzania, 2012). In previous years most of the maize was transported to Dar es Salaam but in 2012 large quantities of maize were transported to Holili (the northeast border town between Kenya and Tanzania located in Kilimanjaro region). In Holili, traders from neighboring countries tended to offer better prices. Furthermore, Holili was a closer destination for some farmers and traders, especially those in and around Arusha.

### VIII. Energy Consumption and Prices

Tanzania imports 100 percent of oil consumed domestically. In 2009, it imported 1,518,000 tons of oil (see table 4). 57 percent of the imports were diesel, 13 percent kerosene, 13 percent fuel oil and 17 percent motor gasoline. Furthermore, 73 percent of the total imported oils were used for transportation, 13 percent was used for
residential purposes\(^4\) while 11 percent was used for industrial production. Since 97 percent of all diesel imports are used for transportation, domestic transportation costs are clearly highly correlated to international oil prices (IEA 2009).

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Domestic Use</th>
<th>Other Non-specified</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas/Diesel</td>
<td>864</td>
<td>840</td>
<td>24</td>
</tr>
<tr>
<td>Kerosene</td>
<td>196</td>
<td></td>
<td>196</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>196</td>
<td>161</td>
<td>22</td>
</tr>
<tr>
<td>Motor Gasoline</td>
<td>262</td>
<td>262</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1518</strong></td>
<td><strong>161</strong></td>
<td><strong>22</strong></td>
</tr>
</tbody>
</table>

Table 4: Tanzania Fuel Import Data - 2009

In addition to oil imports, Tanzania produces its own electricity. Electricity is mainly produced and distributed through the national grid by the Tanzania Electricity Supply Corporation (TANESCO), a state-owned company. In addition to TANESCO, there are two independent power producers, Independent Power Tanzania Ltd. (IPTL) and Songas, who contribute about one-fifth of the total production and sell their output to TANESCO for distribution (GoT; USAID, 2011). In 2009, total production was about 4,628 giga-watts (GWh) out of which 60 percent was from hydropower, 36 percent from gas and the remainder from coal and oil. As seen in table 5, most of the electricity produced is used for industrial and residential purposes (47 and 46 percent respectively).

As of 2009, only 14 percent of Tanzania’s population (mostly in urban areas) had access to electricity compared to 30 percent (on average) in Africa (IEA, 2009). Despite low levels of electrification, electricity supply is unreliable. Service quality is poor and unexpected power cuts are not uncommon. According to the Confederation of Tanzanian Industries (CTI), unreliable electric power supply is a binding constraint to the growth of the manufacturing industry (CTI, 2011). Despite using costly fuel generators, manufacturers make annual losses of 31 billion TZS per year (USD 19 million). In addition, they experience damage in machinery due to fluctuations, become less competitive due to sustained positive price adjustments and terminate on average 7,341 workers annually. In 2006, 88 percent of Tanzanian firms mentioned unreliable electricity as a major constraint to their business operations (World Bank, 2006). Hence, unreliable electricity power supply has significant direct impacts on manufacturing firms and indirect impacts on consumers of manufactured goods.

\(^4\) This figure reflects all the kerosene imports i.e. 196,000 tonnes. No other oil is used for residential purposes.
<table>
<thead>
<tr>
<th>Electricity Production</th>
<th>GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal and peat</td>
<td>125</td>
</tr>
<tr>
<td>- oil</td>
<td>42</td>
</tr>
<tr>
<td>- gas</td>
<td>1677</td>
</tr>
<tr>
<td>- hydro*</td>
<td>2784</td>
</tr>
<tr>
<td><strong>Total Production</strong></td>
<td>4628</td>
</tr>
<tr>
<td>Statistical Differences</td>
<td>-128</td>
</tr>
<tr>
<td><strong>Energy Industry Own Use</strong>*</td>
<td>125</td>
</tr>
<tr>
<td>Losses</td>
<td>899</td>
</tr>
<tr>
<td><strong>Final Consumption</strong></td>
<td>3476</td>
</tr>
<tr>
<td>Industry</td>
<td>1631</td>
</tr>
<tr>
<td>Transport</td>
<td>0</td>
</tr>
<tr>
<td>Residential</td>
<td>1587</td>
</tr>
<tr>
<td>Other Non-Specified</td>
<td>258</td>
</tr>
</tbody>
</table>

Table 5: Electricity Production in Tanzania (2009)

In an attempt to understand the impact of high energy prices on rural and urban households, survey participants (FGD participants and urban households) were asked to rank the most important energy sources consumed. In rural areas, the most important energy sources reported were firewood and kerosene while in urban areas they reported using mostly kerosene and charcoal. Firewood is mostly used for cooking and in dire situations can also be used for lighting. In contrast, in urban areas most people use charcoal for cooking and kerosene for lighting. Some urban households also reported using kerosene-fueled stoves to prepare quick, fast meals, like breakfast. Electricity did not feature as a very important energy source for the households interviewed in this survey, in line with the electrification and energy consumption data cited above.

When asked about energy price trends, there seemed to be a general consensus among the different agents interviewed and FGD participants that energy prices, in particular kerosene prices, had fluctuated so much over the past year making it difficult to generalize them. Transporters, shopkeepers and millers all generally noted price increases of petrol and diesel in recent years and high price volatility. Indeed, as shown in the figure below, oil prices increased between 2010 and 2012.
When probed as to the possible causes of these changing energy prices, respondents’ answers fell in the following categories:

a. One particularly well-informed participant cited high prices in the world market. He explained that because of economic sanctions imposed on oil producing countries, less fuel could be traded in the world market causing prices to increase. Indeed, Tanzania experienced oil supply shortfalls in 2011-2012, partly due to economic sanctions on Iran and the civil war in Libya (IEA, 2012).

b. High taxes imposed by the Tanzanian government on oil companies resulted in higher fuel prices. Some participants cited that because the prices of different fuel sources increased at the same time, they felt confident that the reason for the price increases had to result from government taxes.

Indeed, in the 2011/2012 financial year budget speech, the government of Tanzania announced a 50 percent cut in excise duty on heavy oils and committed to curb inflation. In August 2011, the Energy and Water Utilities Regulatory Authority (EWURA) revised downwards petrol, diesel and kerosene prices. This revision resulted in an abrupt shortage of fuel (due to strikes among oil companies) that in turn led to a hike in fuel prices.
c. The general inflation and depreciation of the Tanzanian shilling meant higher fuel prices for consumers. Indeed, the consumer price index rose steadily between 2010-2012 (IMF, 2012).

d. Participants in Kigoma and Mbeya cited that high fuel prices resulted from the long distance and poor roads from Dar es Salaam, which is the main fuel point of entry. The distance between Dar es Salaam (the fuel port of entry) and Kigoma is approximately 1442 km. Transporting goods from Kigoma to Dar es Salaam costs 832.2 TZS per kilometer (Mkenda and Van Campenhoute, 2011).

<table>
<thead>
<tr>
<th>Region</th>
<th>Distance from Dar es Salaam (km)</th>
<th>Transportation costs (TZS/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kigoma</td>
<td>1442</td>
<td>832.2</td>
</tr>
<tr>
<td>Mbeya</td>
<td>851</td>
<td>528.8</td>
</tr>
<tr>
<td>Dodoma</td>
<td>479</td>
<td>521.9</td>
</tr>
<tr>
<td>Arusha</td>
<td>647</td>
<td>695.5</td>
</tr>
</tbody>
</table>

*Source: Mkenda and Van Campenhoute, 2011*

Table 6: Distance and Transport costs from Dar es Salaam

IX. Coping Strategies

Many farmers reported keeping enough maize for up to three months after harvest, having to subsequently buy maize in the market, often at double the price. When asked why they only kept three months of provisions, discussants replied that they needed cash, forcing them to sell maize post-harvest, when prices hit seasonal lows. Some farmers also reported the potential of exploiting the light rains for a second farming season, especially in Arusha, so that only three months of provisions were required to carry them over to the second harvesting season. It is therefore the months between January and May that are most difficult for farmers to make ends meet. It is rather surprising that despite knowing maize prices will double, many farmers continue to reserve only three months worth of maize. The authors made further inquiries on this matter (after the study was completed) and one plausible explanation seems that some farmers pre-sell their maize before harvesting. This occurs when farmers are in dire need for cash pre-harvest. Therefore, the quantity of maize left to sell and store for consumption is less than normal which in turn affects their ability to store food for longer periods. It is however highly unlikely that this explanation holds across farmers and regions. There is definitively a need to investigate this matter further. One of the key objectives of the study was to understand how participants cope with high energy and food prices. This next section examines how household, urban and rural, traders, middlemen and transporters cope with increasing food and fuel prices.
While coping strategies of urban residents differ slightly from those of rural residents, a common response between the groups was that they do not stop consuming maize even when prices increase. To put it in one respondent’s words, “It’s impossible to stop consuming maize. It’s our main food. We can’t stop eating”. For many urban households, maize grain is the most important food crop. It was mentioned as one of the top three foods households depend on and consume in all urban households interviewed. Hence, even when maize prices increase, households will adopt coping mechanisms in order to continue to consume maize on a daily basis.

a. **Urban households**

When food prices increase, urban households reported coping in the three following ways:

- **Reduce consumption of luxury goods**: When food prices rise, most households reported reducing meat consumption (considered a luxury good) and rice and relying more on beans and green vegetables.

- **Look for new income-generating activities**: Some households reported looking for new or additional ways to generate income such as starting small businesses or looking for better paying jobs. For example, one respondent was a teacher who started teaching afternoon classes (during after school hours) to students who needed extra help.

- **Change the meal composition**: More specifically, when the price of maize rises, most households reported changing the type of food they consume by replacing maize with potatoes, cassava or bananas. Nonetheless, respondents find a way to consume maize at least once a day, which they prepare into ugali. For many, other food crops are not considered food. Respondents explained that when eating crops other than ugali, they would feel hungrier sooner.

As expressed in the last section, kerosene and charcoal are the main energy sources consumed by urban households. When kerosene prices increase, households tend to substitute kerosene with charcoal. Any cooking that might have previously been done with kerosene would be cooked exclusively with charcoal while kerosene would be reserved for lighting. If the charcoal prices rise, some households reported deferring to using firewood.

b. **Rural households**

Coping strategies for rural households are similar to urban households but generally more extreme. For example, while urban households reduce consumption of meat and other expensive food items such as rice, rural households reported actually skipping meals. FGD respondents explained coping with food price changes in the following ways:
• **Skipping meals:** Rural households skip meals (respondents answered “*tunaua wingi*,” Swahili slang meaning “skipping a meal”) during tough times. Most households report either skipping breakfast or delaying breakfast until 11 am. Households that skip breakfast then only consume lunch and dinner. Households that delay breakfast have it instead at 11 am, skip lunch and have dinner. Therefore, school-age children in such households go to school on an empty stomach and return home at 11 am or at lunch time during their break to eat.

• **Reducing the quantity consumed:** Some households decide to keep the same number of meals but reduce the quantity of food cooked at each meal. For example, if they usually consume one kilogram of maize per meal then they would consume 0.75 kg instead during leaner times. Respondents said that every household member then consumes a bit less food than usual.

• **Changing food preparation:** One way in which households reduce quantity but consume the same type of food is by changing how the food is prepared. For example, instead of making *ugali* they make maize porridge, which requires less flour. Again, as with urban households, when food prices are very high, people do not stop consuming maize. By changing the maize preparation to porridge, they still can consume maize. Most households reported changing their afternoon meal with porridge and having a heavier meal for dinner.

There are two main ways in which energy prices affect rural households:

• **Decreasing kerosene consumption:** Since most households depend on kerosene for lighting, higher kerosene prices leads to households consuming less kerosene. Households will purchase and use less kerosene by being more careful about consuming kerosene only when absolutely necessary and/or substituting kerosene by using firewood for lighting.

• **Reducing the purchase of manufactured goods:** The price of fuel affects manufactured goods in two ways: by increasing transportation costs to rural households and by increasing the costs of manufacturing (for those products manufactured within Tanzania). Many of the products consumed by the respondents are indeed manufactured in Tanzania, e.g., sugar, soap and tea. Fuel price increases therefore causes the prices of these goods to increase, resulting in households to purchase and consume fewer of them. For example, instead of having tea or maize porridge with sugar in the morning, they defer to a less tasty breakfast by eliminating sugar. In the surveyed areas, people would not normally opt for a “sugar free” breakfast.

Finally, increases in food and/or fuel prices causes some rural households to look for additional sources of revenue. For example, the very poor tend to look for daily jobs and/or gather wood to sell in the market.
c. **Traders, Middlemen and Shopkeepers**

Trade practices in urban areas differ from those in rural areas, thereby causing food and energy price changes to affect urban and rural traders differently. In urban settings, minor increases in manufacturing costs, especially due to increases in energy prices, are translated directly to the consumer. One trader in Dar es Salaam said "there is no such thing as a loss in doing business". Because prices are competitive and profit margins are quite low, traders cannot afford to absorb any costs. Furthermore, sellers are confident that their prices match their competitor’s prices and that customers will return to purchase their goods after discovering that prices have generally increased. Some urban traders did report seeing fuel price increases as an opportunity to make larger profits by marking up the price even on goods that did not experience price changes.

In rural areas, shopkeepers and traders will not increase the price at which they sell their products until there is a significant increase in the price at which they purchase the good. In the case of kerosene, the threshold is usually an increase of TZS 200 (an equivalent of USD 0.15) per liter. If the cost of kerosene increases by more than TZS 200 per liter then the shopkeeper will change the selling price. When shopkeepers were asked why they were willing to take lower profits instead of increasing the sale price, they gave two reasons: (i) in order to remain competitive with other shopkeepers in the village, they needed to keep their prices as low as possible; and (ii) shopkeepers invest time to build business relationships with their customers who tend to dislike prices that fluctuate too often. Shopkeepers will therefore ensure that the initial mark-up is high enough to be able to absorb smaller price fluctuations. Furthermore, because shopkeepers usually sell multiple goods, they can absorb increases in prices for certain goods by making small price adjustments for other goods.

While most rural traders we interviewed acknowledged knowing other markets where they could buy their commodities at a cheaper price, they still went to closer and more expensive markets. Their choice of market is mainly driven by insufficient business capital. They claimed that the fixed costs (specifically of transport and cargo) of going to further markets were too high relative to the size of their business. Only three traders in Kigoma and Arusha mentioned visiting further and larger markets when prices at nearby markets rose significantly.

d. **Transporters**

Most transporters do not transport their own goods. They travel to rural areas either during the harvest season or when they are hired to collect specific goods by urban clients. Their business model is more similar to urban traders, i.e., they will pass on any fuel price fluctuations to their client to ensure they make a reasonable profit. They may absorb some costs when business is low, i.e., during non-harvest months, so long as they can ensure some profit, they will travel
wherever there is business regardless of fuel costs, distance and road conditions. They usually get contracts to transport goods in one direction but have no guarantee of having business on their way back, frequently having to travel back with empty trucks. Therefore, they have to make sure profits are made on their one-way business contract.

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<th>Group</th>
<th>Location</th>
<th>Food price increase</th>
<th>Fuel price increase</th>
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<td>Households</td>
<td>Rural</td>
<td>1. Skip Meals</td>
<td>1. Decrease kerosene consumption</td>
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<td>2. Reduce food quantity consumed</td>
<td>2. Reduce consumption of manufactured goods</td>
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<td>3. Change food preparation</td>
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<td>Urban</td>
<td>1. Reduce consumption of luxury goods</td>
<td>1. Substitute kerosene with charcoal</td>
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<td>2. Change meal composition</td>
<td>2. Switch to using firewood</td>
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<td>3. Find new income-generating activities</td>
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<td>Traders</td>
<td>Rural</td>
<td>Absorb small price fluctuations to remain competitive and retain customers</td>
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<td>Pass on price increases to consumers</td>
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<tr>
<td>Transporters</td>
<td>Urban</td>
<td>1. Pass on price increases to consumers</td>
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<td>2. May settle for less profits by absorbing some costs during the low season</td>
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Table 4: A summary of coping strategies

X. Conclusions

Several important findings emanate from this qualitative study. Because maize is a staple food consumed by most Tanzanian households, increases in the price of maize cause households to make adjustments that still allow them to consume maize daily. Given the dependence of maize prices to many external factors beyond the control of price taking smallholder farmers (e.g., rainfall, demand for maize from neighboring countries, etc.), even small fluctuations in any of these factors can lead to large price fluctuations. Coping mechanisms include finding additional sources of revenue, skipping meals, eating less and/or substituting maize with other crops, some of which may have strong nutritional implications, especially for young children.

Urban and rural households reported depending on kerosene, charcoal and firewood for fuel. Increases in prices of these goods cause households to reduce consumption of those goods and/or look for additional sources of revenue and/or substitute one energy source with a cheaper one, e.g., substituting charcoal with firewood. Increases in prices of other energy sources affect households indirectly, by increasing the costs of transporting goods to local markets and increasing the costs of manufacturing the goods. While traders in rural areas may absorb small price increases, price increases for both maize and fuel products are generally passed on to consumers. Most fuel products appear to be directly linked to international market prices, with the exception of charcoal and firewood, which are produced within Tanzania. The biggest source of variation in maize prices in Tanzania is agricultural seasons. Maize prices in Tanzania appear to be less directly linked to global markets, given the relatively high production of maize within Tanzania.
Although not discussed explicitly by participants, increases in fuel prices also have direct implications for maize production. Maize yields depend heavily on the application of fertilizer. Since the distribution and manufacturing of fertilizers depend on fuel prices, higher fuel prices lead to higher costs of distributing and manufacturing fertilizers. Extending subsidy programs will necessitate larger budgets to cover the same number of recipients. Higher fuel prices will also lead to tighter budget constraints for smallholder farmers, as it will lead to increasing costs of other goods readily consumed by farmers. Finally, rising fuel costs cause households to substitute for purchased fuel products with alternative fuels they can find on their own, i.e. replacing kerosene with firewood, causing additional stress on natural resources.

Because there are multiple ways that fuel prices affect food prices and hence food security, there are potentially multiple mechanisms in which governments can intervene. Smallholders are often cash-constrained, forcing them to sell their harvests when prices are low and preventing them from investing in productive inputs such as fertilizer. Micro-credit programs could therefore be beneficial for these farmers. Subsidies allow some farmers that would otherwise not purchase fertilizer to purchase them. However, the proper targeting of recipients and the timely distribution of vouchers are critical to make subsidies efficient. Indeed, because recipients must cover some of the costs, targeting vulnerable households, e.g., female-headed households, may prevent subsidy programs from being successful. As described by FGD participants, the delayed distribution of vouchers may make fertilizer application useless. Investing in on-site (within village) storage facilities may help smooth prices across seasons. In addition, if farmers cannot store food beyond 3 months due to uncontrolled consumption then having within-village food storage groups may help mitigate issues of self-control.

The findings in this study have revealed some ways in which food and fuel price fluctuations are transmitted to and affect households. These results are summarized from interviews and focus group discussions and so cannot be tested statistically. While we expect future fuel and food price increases to affect households in similar, yet more extreme ways, any prediction is speculative. Consistent future increases in maize and fuel prices will likely cause households to adopt more extreme coping mechanisms, e.g., finding substitutes and/or adopting new technologies that are not as highly dependent on fuel.
XI. References


Confederation of Tanzania Industries (2011). “Challenges of unreliable electric supply to manufacturers in Tanzania”.


Dillon B and Barrett C (2013). “Global oil and grain prices in east Africa”.


USAID (2010). “Staple foods value chain analysis”.


Appendix 1. Sampling strategies for TZ field work

I. Villages (Target = 1 per region)
   1. Present research permit at regional office upon arrival
   2. Talk to regional planning commissioner to identify villages that satisfy the following criteria:
      a. Far enough away from a major trading center (30-50km?) that daily round trip travel by foot or bicycle is rare or impossible
      b. Not the richest village around
      c. At least 5+ kilometers off of the tarmac

II. Focus Group participants (Target = 9-10 per village)
   1. Meet the village chairman
   2. Ask him to choose 5 names each from the low, middle, high income categories
      a. No need to stratify on gender
      b. Emphasize the need for respondents who will enjoy talking in a group
      c. “People for whom farming is an important activity”
      d. Some (2-3) people who use inorganic fertilizer in farming
   3. Then randomly select 3 names from each of the income lists, and ask the chairman's assistance recruiting those people to the FG meeting the next morning at XX a.m. (for a total of 9 participants)
   4. Keep the other 6 selected villagers as replacements

III. Shops and Mills (Target = 1 Mill, 2 Shops)
   1. Mills
      a. If there is only one mill, choose it
      b. If there are multiple mills, choose the one most important for maize
      c. If there is no mill, ask around to find one in a nearby village
   2. Take 2 shops/kiosks in the village
      a. The most important kiosk
      b. The longest-running kiosk
      c. Try to ensure that they both sell kerosene and maize (or other grains)
      d. If the shops don’t sell kerosene and maize, try to find the largest shop that does sell these goods, or the nearest shop to this village that sells kerosene and maize (or another grain)

IV. Urban Households (Target = 3-5 per city)
   1. Locate a “normal” ten-cell (not the richest, not the poorest) and contact the leader
   2. Ask for introductions to a local market or to a group of individuals who make choices for their households about food and energy purchasing and consumption

V. Middlemen (Target = 2-4)
   1. Find the local wholesale grain market chairman
2. Ask for introductions to the largest, most sophisticated, longest-running middlemen / transport companies
3. Also verify whether there are two distinct classes of transporters who deal in different crops or goods
   a. If so, be sure to sample at least one middleman from each group
4. Try to choose an interviewee who operates in the area of the village that we are working with
Appendix 2. Middlemen Questionnaires

Location: ______________________   Start time: __________
Date: ___________________________   End time: __________
Moderator: ______________________   Tape ID: __________
Note taker: ______________________

**I. Interview Questions for Middlemen**

**Introduction:**
*Welcome. Thank you for participating in this discussion. My name is ____________ and I am a researcher working with IGC. This is my colleague ____________. We are conducting a study to learn more about fuel, fertilizer and food prices. Your participation here is entirely voluntary and you are free to end the interview at any time.*

*We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.*

*Do you agree to participate? [Wait for the response]. Do you have any questions before we proceed?*

*Thanks again for your participation. I will ask you some questions while my colleague, ____________, writes notes on the discussion. We will also tape the conversation in case we cannot write all the important notes down.*

1. Which crops do you primarily trade/transport? Does your crop mix change with the seasons?

2. Do you trade these crops? Or transport these crops? Or both?
   - [] Trade *(answer questions 1 - 10)*
   - [] Transport *(answer questions 1 - 13)*
   - [] Both *(answer questions 1 - 13)*
   - [] Other, specify _________________

3. What are your most common trading relationships *(circle the relevant ones)*:
   - a. Regular markets in cities and trading towns
   - b. Infrequent markets
c. Village buying stations and warehouses  
d. Direct purchase from farmer groups  
e. Direct purchase from individual farmers  
f. Other?

4. Do you tend to trade/transport crops both to and from villages and small trading towns? Does this change seasonally?

5. How do you determine the prices to charge to clients?

6. How important is the price of fuel in determining:  
   a. Which markets you travel to?  
      [ ] very important  [ ] moderately important  [ ] not so important  
   b. Which roads you use?  
      [ ] very important  [ ] moderately important  [ ] not so important  
   c. What kinds of crops/goods you carry (i.e. does profit/weight matter more when fuel prices are high?)  
      [ ] very important  [ ] moderately important  [ ] not so important  
   d. The frequency with which you make trips?  
      [ ] very important  [ ] moderately important  [ ] not so important  

7. Do you ever carry/trade fertilizer? If so, what proportion of your transport work deals with fertilizer? Is this a seasonal activity?

8. Are there months in which you do not trade at all? If so, why?
9. Does the number of crop traders (i.e. your competition) vary substantially from one year to the next, or from one season to the next? If so, what drives entry/exit from the market?

10. In the location where buy your crops, are there any traders who come in from neighboring countries? If yes, does their presence impact trade?

11. How would you describe fuel and food prices over the past year?

12. What are the primary ways in which you are affected by government rules, regulations, and taxes, including:
   a. Licensing requirements
   b. Permits for trading certain crops or in certain areas
   c. Taxes or subsidies that you personally pay/receive
   d. Taxes or subsidies that your trading partners pay/receive, which affect the price at which you buy or sell

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[Make sure you have a good sense of the full seasonal pattern of this trader’s activities, including crop mix, direction of trade, and likelihood of]
changing trading markets based on distance, fuel prices, food prices, road conditions, or other factors. Probe to fill in any missing data.]

**If transporter, or a crop trader also transports:**

13. Do you ever drive an empty truck for one-half of a round trip journey? If so, in which direction?
   [ ] Y  [ ] N  
   If yes:

14. Does your route change seasonally? If so, why? (*probe for passability of roads vs. timing of harvests, etc.*)

15. Do you have preferred towns or stations for buying diesel/petrol?

16. If so, is your preference based on fuel quality, price, both, something else?
Appendix 3. Miller questionnaires

| Location: ______________________ | Start time: ___________ |
| Date: __________________________ | End time: ____________ |
| Moderator: ______________________ | Tape ID: ____________ |
| Note taker: ______________________ |

**Interview questions for mills**

**Introduction:**

Welcome. Thank you for participating in this discussion. My name is ___________________ and I am a researcher working with IGC/Cornell University. This is my colleague ________________. We are conducting a study to learn more about fuel, fertilizer and food prices. Your participation here is entirely voluntary and you are free to end the interview at any time.

We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.

Do you agree to participate? [Wait for the response]. Do you have any questions before we proceed?

Thanks again for your participation. I will ask you some questions while my colleague, ________________, writes notes on the discussion. We will also tape the conversation in case we cannot write all the important notes down.

1. What grains do you mill at this store?
   - [ ] maize
   - [ ] rice
   - [ ] other, specify ________________

2. Do you also buy grains and/or sell milled grains (e.g., maize flour or husked rice)?
   - [ ] Y
   - [ ] N (If no, stop after question 9).

3. What is the power source for the mill?
   - [ ] electricity
   - [ ] generator
   - [ ] other, ________________

4. What do you do when you can’t access that power source?
5. How would you describe the price trends of these energy product(s)? What about the prices of the grains (the grains that are milled)?

6. When (what months) do you have the most people come in to mill their product?
   - Jan
   - Feb
   - March
   - April
   - May
   - June
   - July
   - August
   - Sept
   - Oct

7. How do you determine the price to charge to clients?

8. If energy prices increase, does this change the price of the products you sell?
   - Y
   - N

9. For what increase in fuel/energy price would you change the price of the good/service you sell?

For mills who also buy grains and/or sell milled grains:

10. Who do you buy grains from?

11. Who do you sell you milled grains to?

12. When (what months) do you buy most grains? Why?
   - Jan
   - Feb
   - March
   - April
   - May
   - June
   - July
   - August
   - Sept
   - Oct

   Why:

13. When (what months) do you sell most milled grain?
   - Jan
   - Feb
   - March
   - April
   - May
   - June
   - July
   - August
   - Sept
   - Oct

   Why:
14. Do you ever store grains? If yes, for how long?
   [] Y    [] N

   If Y:

15. How do you determine the price to charge to buyers? To grain sellers?

16. If energy prices increase, does this change the price of the products you sell?

17. For what increase in energy price would you change the price of the good/service you sell?

18. For what increase in grain price would you change the price of the good/service you sell?
Appendix 4. Rural households questionnaire

| Location: _______________ | Start time: ____________ |
| Date: _______________ | End time: ____________ |
| Number of participants: F: ______., M: ______. | Tape ID: ____________ |
| Moderator: _________________________ | Note taker: _________________________ |

Questions for rural households

Introduction:

Welcome. Thank you for participating in this discussion. My name is _______________ and I am a researcher working with IGC/Cornell University. This is my colleague _______________. We are conducting a study to learn more about fuel, fertilizer and food prices and you and your household’s decisions regarding fuel, fertilizer and food consumption. Your participation here is entirely voluntary and you are free to leave at any time.

We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.

If everyone agrees to participate then we can proceed with introductions. Does everyone agree to participate? [Wait for the response]. Does anyone have any questions before we proceed?

Let us go around the table and introduce ourselves...

Thanks again for your participation. We will now proceed with the discussion. I will ask you some questions while my colleague, _______________, writes notes on the discussion. Again he/she is not taking notes on who is saying what, but rather on the general content of the discussion. We will also tape the conversation in case we cannot write all the important notes down.

A. Seasonal Calendar - Food, fuel and fertilizer prices, availability and consumption

1. When do the rainy seasons occur in this region?

2. What are the three energy types your household consumes (for cooking, lighting, heating and transport) (e.g., kerosene, gasoline, oil)?

3. What are the top three crops you and your household members grow (in terms of land allocated to grow these crops)? Again, encourage here a
discussion among participants to rank the crops most likely to be grown by households in this region

4. If used, which are the most common inorganic fertilizers used by residents of this village on these crops?

5. What are these different energy sources used for?

6. Of these energy types and crops, which do you and your household use most frequently? The second most frequently? The third most frequently? Encourage here a discussion among participants for them to agree upon the order of importance. Alternatively, ask each individual to rank his or her household’s experience individually and take note.

7. For the three most readily grown crops, when is the planting season? Harvest season?

8. For the three most readily used energy types, crops and fertilizers listed, do prices and/or availability fluctuate seasonally (monthly)? If yes, what months is the price generally highest? Lowest? What months are energy/food shortages most likely? What months does your household consume most of these energy types?

B. Open-ended questions
Proceed to lead a discussion given the following open-ended questions below.

1. How would you describe food prices generally over the past year? What about energy prices?

2. What do you think explains the food price fluctuations you experience? What about energy type price fluctuations?

3. Do you notice any quality differences in the food you purchase when the prices change? What about with energy types changes?

4. Have you ever tried to purchase a food or energy type but could not find it on the market?

5. What do you do when this happens?
   - Food:
   - Fuel:
6. Have you ever wanted to purchase a fuel or food product but couldn’t afford it?

7. What do you do when this happens? Are you likely to purchase less fuel or food, or would you more likely give up certain goods to be able to purchase the fuel?
   - Food:
   - Fuel:

8. What items are you likely not to consume/purchase when prices for fuel increase?

9. When fuel prices increase, do you notice any price increases of other products your household consumes?

10. If yes, which products also increase?

11. Do you change any farm management practices when input prices are high?

12. If yes, what changes do you make (for what input price change)?

13. Have you ever chosen not to buy fertilizers? Why? I.e., what drives you to buy or not buy fertilizer?

**Conclusion:**

Thank you again for your time and participation today. The discussion today and similar discussions we will hold and have held in other regions of Tanzania will help us better understand your situation and the constraints you face when fuel prices increase.
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Appendix 5. Shopkeeper questionnaire

| Location: ______________________ | Start time: ____________ |
| Date: ________________ | End time: ________________ |
| Moderator: ______________________ | Tape ID: ____________ |
| Note taker: ______________________ |

Interview questions for rural town vendors/shopkeepers

Introduction:

Welcome. Thank you for participating in this discussion. My name is ______________________ and I am a researcher working with IGC/Cornell University. This is my colleague _________________. We are conducting a study to learn more about fuel, fertilizer and food prices. Your participation here is entirely voluntary and you are free to end the interview at any time.

We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.

Do you agree to participate? [Wait for the response]. Do you have any questions before we proceed?

Thanks again for your participation. I will ask you some questions while my colleague, _________________, writes notes on the discussion. We will also tape the conversation in case we cannot write all the important notes down.

Questions – for shopkeepers only

1. What fuel/energy products do you sell in this store?
   - [ ] kerosene
   - [ ] petrol
   - [ ] diesel
   - [ ] gas
   - [ ] other, ______________________

2. What staple foods (i.e., grains or flour) do you sell in this store?
   - [ ] maize (whole)
   - [ ] maize flour
   - [ ] rice
   - [ ] wheat flour
   - [ ] millet
   - [ ] sorghum
   - [ ] other, ______________________

3. How far do you travel to procure the different fuel products that you sell in this store (approximate km)?
4. How far do you travel to procure the different grains that you sell in this store (approximate km)?

5. Is there another market you would prefer buying from? If yes, why don’t you go there?
   [ ] Y          [ ] N

   If Y, why:

6. Does the sourcing of these products vary during parts of the year? If so, why?
   For which products?
   [ ] Y          [ ] N

   If Y, why & for which products:

7. Do you sell these products all year? If no, why not?
   [ ] Y          [ ] N

   If N, why:

8. How do you determine the prices to charge to clients for the different fuel types and grain products that you sell in the store?

9. How would you describe the price trends of fuel products over the past year? Of grains (the grains sold at the store or the mill)?

10. If fuel prices increase, does this change the price of the products you sell?
11. For what increase in fuel price in your source market would you change the price of the good (fuel product) you sell?

12. For what increase in grain price in your source market would you change the price of the good (grain product) you sell?

13. When (what months) do you sell most fuel? Most grains?
Appendix 6. Shopkeeper questionnaire

| Location: ______________________ | Start time: ___________ |
| Date: ___________________________ | End time: ______________ |
| ________________________________ | ______________________ |

Moderator: ______________________
Tape ID: __________
Note taker: ______________________

Interview questions for rural town vendors/shopkeepers

Introduction:

Welcome. Thank you for participating in this discussion. My name is ____________ and I am a researcher working with IGC/Cornell University. This is my colleague _______________. We are conducting a study to learn more about fuel, fertilizer and food prices. Your participation here is entirely voluntary and you are free to end the interview at any time.

We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.

Do you agree to participate? [Wait for the response]. Do you have any questions before we proceed?

Thanks again for your participation. I will ask you some questions while my colleague, ____________, writes notes on the discussion. We will also tape the conversation in case we cannot write all the important notes down.

Questions – for shopkeepers only

1. What fuel/energy products do you sell in this store?
   [ ] kerosene [ ] petrol [ ] diesel
   [ ] gas [ ] other, ______________________

2. What staple foods (i.e., grains or flour) do you sell in this store?
   [ ] maize (whole) [ ] maize flour [ ] rice
   [ ] wheat flour [ ] millet [ ] sorghum
   [ ] other, ______________

3. How far do you travel to procure the different fuel products that you sell in this store (approximate km)?
4. How far do you travel to procure the different grains that you sell in this store (approximate km)?

5. Is there another market you would prefer buying from? If yes, why don’t you go there?
   [ ] Y    [ ] N

   *If Y, why:*

6. Does the sourcing of these products vary during parts of the year? If so, why?
   For which products?
   [ ] Y    [ ] N

   *If Y, why & for which products:*

7. Do you sell these products all year? If no, why not?
   [ ] Y    [ ] N

   *If N, why:*

8. How do you determine the prices to charge to clients for the different fuel types and grain products that you sell in the store?

9. How would you describe the price trends of fuel products over the past year? Of grains (the grains sold at the store or the mill)?

10. If fuel prices increase, does this change the price of the products you sell?
11. For what increase in fuel price in your source market would you change the price of the good (fuel product) you sell?

12. For what increase in grain price in your source market would you change the price of the good (grain product) you sell?

13. When (what months) do you sell most fuel? Most grains?
Appendix 7. Urban household questionnaire

| Location: ______________________ | Start time: ____________ |
| Date: __________________________ | End time: _______________ |
| Interviewer: ____________________ | Tape Id: ____________ |

Interview questions for urban households

Introduction:

Welcome. Thank you for participating in this interview. My name is ___________________ and I am a researcher working with IGC/Cornell University. We are conducting a study to learn more about fuel and food prices and you and your household’s decisions regarding fuel and food consumption. Your participation here is entirely voluntary and you are free to leave at any time.

We are here to learn from you. We will ask you some questions. There are no right or wrong answers to any of the questions/issues we will discuss. You should feel comfortable discussing all sides of a given issue (both positive and negative). Your name will not be taken down or shared with anyone.

Do you agree to participate? [Wait for the response]. Do you have any questions before we proceed?

Thanks again for your participation. We will now proceed with the discussion. I will ask you some questions and write notes on the discussion on the general content of the discussion. I will also tape the conversation in case I cannot write all the important notes down.
Use questions 1-3 to fill out table 1 below.

1. What are the three most important energy sources that your household consumes?

2. What are they used for (e.g., cooking, lighting, transportation, other (specify))? 

3. Does the consumption of these energy sources change during certain parts of the year? If yes, during what months does consumption increase?

<table>
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<tr>
<th>Question 1</th>
<th>Question 1b</th>
<th>Question 2</th>
<th>Question 3</th>
<th>Question 3a</th>
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<td>Ranking (1-3)</td>
<td>Use</td>
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<td>Months which consumption increases?</td>
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4. Why is the additional consumption needed during those months (specify for which energy source)?

5. How would you describe the price trends for these energy sources over the past year (specify which energy source)?

6. Over the past year, did you experience any power cuts? If yes, how frequent were they? (If no, skip to question 11.)
7. Was your household affected by these power cuts? If yes how?

8. What energy alternatives did you use during this period?

9. Did this crisis affect your spending decisions? If yes, how?

10. Were there items you had to forego during this period? If so, which ones?

11. When energy prices rise, are you more likely to purchase less fuel/energy source, or would you more likely give up certain goods to be able to purchase the fuel/energy source?
   [ ] purchase less fuel
   [ ] give up certain goods
   [ ] other, ________________________________

12. Did you notice any quality differences in the fuels purchased when the prices changed?
   [ ] Yes    [ ] No

   Comments:

13. What are the three most important food products for your household?
14. How would you describe the price trends for these foods over the past year?

15. Have you noticed any price change in these foods when fuel prices increase?  
[ ] Yes  [ ] No  

Comments:

16. Do you change your diet when these food prices are high?  
[ ] Yes  [ ] No

17. If no, why not? If yes, how?

18. How long have you lived in this town or village?

19. What is your age, main occupation, household income range and family size?

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**Conclusion:**

Thank you again for your time and participation today. The discussion today and similar discussions we will hold and have held in other regions of Tanzania will help us better understand your situation and the constraints you face when fuel prices increase.