Kenya
Impacts of the Ukraine and Global Crisis on Food Systems and Poverty

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Overview

• **Series of country case studies**
  - Economywide modeling
  - Capture world market shocks
  - Estimate impacts on economy, agri-food system, poverty, food security, etc.
  - Simulate policy responses

• **Three phases of analysis:**
  1. Initial data collection and impact assessment
  2. Data revisions and analysis of broad policy options
     • Cash transfers, food aid, and fertilizer subsidies
     • Fiscal implications for national governments
  3. In-country engagement and tailored policy analysis

Countries with IFPRI RIAPA models

![Map of countries with IFPRI RIAPA models]
Impact Channel Considerations

- **World price**: How big is the increase in world price?
- **Trade share**: How important are imports in local market? Can local producers substitute for imports?
- **Direct use**: Which sectors use the product as an input?
- **Indirect use**: Which other sectors are affected via supply chains?
- **Incomes**: What kinds of workers and households earn incomes within the affected sectors?
- **Final use**: Which households consume the affected products?

World Price Shocks

**Change in real world prices (June 2021 to April 2022)**

- **30 Jun 2021 - 31 Jan 2022**
  - Maize: 11%
  - Rice: 100%
  - Wheat: 56%
  - Palm oil: 34%
  - Crude oil: 88%
  - Natural gas: 101%

- **31 Jan 2022 - 30 Apr 2022**
  - Maize: 11%
  - Rice: 100%
  - Wheat: 56%
  - Palm oil: 34%
  - Crude oil: 88%
  - Natural gas: 101%

Source: World Bank Pink Sheets
Shocks | World Food, Fuel and Fertilizer Prices

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**Supply and Demand**

**Supply (% by source)**

<table>
<thead>
<tr>
<th>Product</th>
<th>Imports</th>
<th>Domestic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>98%</td>
<td>2%</td>
</tr>
<tr>
<td>Wheat</td>
<td>82%</td>
<td>18%</td>
</tr>
<tr>
<td>Edible oils</td>
<td>45%</td>
<td>55%</td>
</tr>
<tr>
<td>Oil products</td>
<td>96%</td>
<td>4%</td>
</tr>
</tbody>
</table>

**Demand (% by use)**

<table>
<thead>
<tr>
<th>Product</th>
<th>Exports</th>
<th>Final use</th>
<th>Input use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>77%</td>
<td>23%</td>
<td>0%</td>
</tr>
<tr>
<td>Wheat</td>
<td>63%</td>
<td>35%</td>
<td>0%</td>
</tr>
<tr>
<td>Edible oils</td>
<td>52%</td>
<td>40%</td>
<td>0%</td>
</tr>
<tr>
<td>Oil products</td>
<td>24%</td>
<td>76%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Products’ share of the value of total demand throughout the economy: 2.3% + 0.9% + 0.9% + 2.8% + Others = 100%

Source: IFPRI Kenya RIAPA Model
**Impact Channel Considerations**

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**Consumption Baskets**

Kenya data

**Composition of household consumption spending**

- **Cereals & edible oils**
  - All households: 53.8%
  - Rural: 53.7%
  - Urban: 54.0%
  - Poor: 52.2%
  - Nonpoor: 54.7%

- **Other foods**
  - All households: 49.3%
  - Rural: 49.3%
  - Urban: 48.2%
  - Poor: 49.4%
  - Nonpoor: 49.1%

- **Non-food goods & services**
  - All households: 37.2%
  - Rural: 37.9%
  - Urban: 36.9%
  - Poor: 37.2%
  - Nonpoor: 37.2%

**Source:** IFPRI Kenya RIAPA Model
Shocks | Fertilizer Response (crop productivity effect)

**Impact Channel Considerations**

- **Adoption**: What share of cultivated land uses fertilizers?
- **Application**: How much fertilizer is being used? *(i.e., fertilizer application rate)*
- **Price**: How big is the domestic fertilizer price increase?
- **Demand**: How do farmers react to rising fertilizer prices? *(i.e., price elasticity of fertilizer demand)*
- **Timing**: When is the fertilizer needed?
- **Response**: How do yields change with reduced fertilizer use? *(i.e., fertilizer response ratio)*

**Fertilizer Adoption Rate**

<table>
<thead>
<tr>
<th>Kenya</th>
<th>Share of cultivated land using fertilizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>71.2%</td>
</tr>
<tr>
<td>Sorghum &amp; millet</td>
<td>35.5%</td>
</tr>
<tr>
<td>Rice</td>
<td>93.8%</td>
</tr>
<tr>
<td>Wheat</td>
<td>91.4%</td>
</tr>
<tr>
<td>Pulses</td>
<td>26.7%</td>
</tr>
<tr>
<td>Irish potatoes</td>
<td>77.6%</td>
</tr>
<tr>
<td>Leafy vegetables</td>
<td>44.3%</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>64.3%</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>30.1%</td>
</tr>
<tr>
<td>Tobacco</td>
<td>70.0%</td>
</tr>
<tr>
<td>Bananas</td>
<td>0.8%</td>
</tr>
<tr>
<td>Other fruits</td>
<td>17.7%</td>
</tr>
<tr>
<td>Leaf tea</td>
<td>32.7%</td>
</tr>
<tr>
<td>Coffee</td>
<td>16.5%</td>
</tr>
<tr>
<td>Cut flowers</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Source: IFDC Kenya*
Shocks | Fertilizer Response (crop productivity effect)

### Impact Channel Considerations

- **Adoption**
  - What share of cultivated land uses fertilizers?

- **Application**
  - How much fertilizer is being used? *(i.e., fertilizer application rate)*

- **Price**
  - How big is the domestic fertilizer price increase?

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  - How do farmers react to rising fertilizer prices? *(i.e., price elasticity of fertilizer demand)*

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### Crop Calendar

*Planting for Kenya’s main 2022 season is already underway*

Source: FEWSNET Kenya
Results | GDP and Employment

• National GDP and employment declines
  • Negative terms-of-trade shock
    (i.e., negative effect of higher import prices outweighs positive effect of higher export prices)
  • Rising import costs reduces spending on domestically produced goods
  • Falling production leads to job losses
  • Impacts occur throughout the economy

• Agri-food system GDP and employment also fall
  • GDP declines in both primary agriculture and off-farm agri-food sectors (e.g., processing, trading)
  • Larger GDP declines in agriculture (equal to 30% of overall GDP losses in the country)
  • Faster job losses in off-farm sectors, especially in food-related services, incl. trade and transport

Source: IFPRI Kenya RIAPA Model

<table>
<thead>
<tr>
<th>Change in GDP and employment due to food, fuel and fertilizer shocks (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
</tr>
<tr>
<td>Whole economy</td>
</tr>
<tr>
<td>-2.6%</td>
</tr>
<tr>
<td>Whole AFS</td>
</tr>
<tr>
<td>-2.1%</td>
</tr>
<tr>
<td>Agriculture</td>
</tr>
<tr>
<td>-1.8%</td>
</tr>
<tr>
<td>Off-farm</td>
</tr>
<tr>
<td>-4.7%</td>
</tr>
<tr>
<td>Outside AFS</td>
</tr>
<tr>
<td>-3.2%</td>
</tr>
</tbody>
</table>

Contribution to total change

- Agriculture: 30%
- Off-farm: 60%
- Outside AFS: 9%
Results | Drivers of GDP Losses

• Fuel and fertilizer shocks drive most of the decline in national GDP

• Agri-food GDP losses mostly driven by fertilizer shocks
  • Fertilizer directly affects primary agricultural production
  • Disrupts downstream processing via supply chains
  • Off-farm also adversely affected by higher fuel prices, which raise the cost of transport services

• GDP losses outside the agri-food system driven more by higher fuel prices
  • Higher transaction costs
  • Lower consumer demand

<table>
<thead>
<tr>
<th>Percentage change in real GDP due to food, fuel and fertilizer shocks (%)</th>
<th>Whole economy</th>
<th>Whole AFS</th>
<th>Agriculture</th>
<th>Off-farm</th>
<th>Outside AFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food prices</td>
<td>-0.8%</td>
<td>-1.0%</td>
<td>-1.1%</td>
<td>-0.7%</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Fuel prices</td>
<td>-0.4%</td>
<td>-0.8%</td>
<td>-1.0%</td>
<td>-0.2%</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Fertilizer prices &amp; response</td>
<td>-0.3%</td>
<td>-0.1%</td>
<td>-0.4%</td>
<td>-0.1%</td>
<td>-0.4%</td>
</tr>
</tbody>
</table>

Source: IFPRI Kenya RIAPA Model
**Results | Household Consumption**

- **Household consumption falls significantly**
  - Larger than GDP losses as production shifts to exports to cover import costs & in response to real exchange rate
  - Rising food prices is a more important driver of consumption losses than for GDP losses

- **Importance of shocks differs across population groups:**
  - **Fertilizer shocks** important for rural and poor households
    - Rely more on farm incomes
    - Consume more domestically-produced foods
  - **Fuel shocks** important for urban and nonpoor households
    - Earn more income outside the agri-food system
    - More import-intensive consumer basket
    - Consume products with larger transaction cost margins
  - **Food prices** affect all households
    - Higher food consumption share for poor households, means slightly larger impacts

**Source:** IFPRI Kenya RIAPA Model
Results | Changes in Inequality

• Differential effects on poor/nonpoor households driven by changes in inequality:
  
  • Fuel shocks causes larger consumption losses for households in the top quintile
  
  • Fertilizer shocks affect lowest quintile much more than top quintile, causing inequality to increase significantly
  
  • Food prices have similar impact across the income distribution
  
• Overall, inequality rises
  
  • Slightly larger consumption losses in Quintile 2, which spans Kenya’s poverty line

Percentage change in quintile consumption

Source: IFPRI Kenya RIAPA Model
Results | Poverty

- Poverty rises significantly
  - Headcount rate up 2.5% points
  - 1.1 million more people pushed into poverty

- Larger increase in poverty in rural areas
  - Four-fifths of expanded poor population
    - Larger increase in rural poverty headcount rate
    - Rural population much larger than urban population
  - Mainly driven by fertilizer shock

### Change in poverty headcount rate (%-point)

<table>
<thead>
<tr>
<th></th>
<th>Food prices</th>
<th>Fuel prices</th>
<th>Fertilizer prices &amp; response</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>0.6%</td>
<td>0.7%</td>
<td>1.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Urban</td>
<td>0.5%</td>
<td>0.6%</td>
<td>0.3%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Rural</td>
<td>0.7%</td>
<td>0.7%</td>
<td>1.8%</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

### Change in poor population (1000s)

<table>
<thead>
<tr>
<th></th>
<th>Food prices</th>
<th>Fuel prices</th>
<th>Fertilizer prices &amp; response</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>290</td>
<td>300</td>
<td>532</td>
<td>1,122</td>
</tr>
<tr>
<td>Urban</td>
<td>81</td>
<td>94</td>
<td>48</td>
<td>222</td>
</tr>
<tr>
<td>Rural</td>
<td>199</td>
<td>193</td>
<td>507</td>
<td>899</td>
</tr>
</tbody>
</table>

Source: IFPRI Kenya RIAPA Model
Results | Diet Quality

- Food, fuel and fertilizer shocks together increase the cost of a healthy reference diet
  - Reference diet is the EAT-Lancet’s “healthy” diet thresholds for the major food groups
  - Driven by rising prices for edible oils (added fats) and cereals (staples)

- Rising food prices and falling incomes worsen diets
  - Prior to the crisis, few households had consumption levels and diversity needed for a healthy diet
  - Crisis increases population with inadequate diets and widens the gap between current household consumption and what is required for a healthy diet
  - Rural households account for more of the deterioration in diet quality

### Net change in cost of healthy diet

<table>
<thead>
<tr>
<th>Food group</th>
<th>Net change in cost of healthy diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added fats</td>
<td>11.7%</td>
</tr>
<tr>
<td>Proteins</td>
<td>11.2%</td>
</tr>
<tr>
<td>Dairy</td>
<td>13.6%</td>
</tr>
<tr>
<td>Fruits</td>
<td>23.1%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>30.7%</td>
</tr>
<tr>
<td>Staples</td>
<td>9.8%</td>
</tr>
</tbody>
</table>

### Change in the real cost of a healthy reference diet (%)

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<td>-0.6%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-0.6%</td>
</tr>
<tr>
<td>Staples</td>
<td></td>
</tr>
</tbody>
</table>

### Increase in total gap between consumption and a healthy diet

- Rural: 5.2%
- Urban: 3.3%

### Contribution to overall percentage change

- Rural: 1.9%
- Urban: 3.1%

**Note: ReDD Index**

Changes in diet quality are measured using the Reference Diet Deprivation index, which compares household-level consumption across six major food groups to the cost of a healthy or nutritionally-adequate diet. ReDD is a multi-dimensional gap measure and can be interpreted in a similar way as the poverty gap measure. See [here](#).
Headlines

• **Food, fuel and fertilizer shocks lead to large reductions in GDP and employment in Kenya**
  - Agri-food system adversely affected, alongside the broader economy
  - Agriculture is particularly at risk to fertilizer shocks, esp. if it leads to lower fertilizer use in the current season

• **Poor and rural households are especially vulnerable**
  - Larger income losses
  - Greater increase in poverty (esp. number of poor people)
  - Larger contribution to the deterioration in diet quality

• **Next steps**
  - Evaluate policy options available to governments and development partners to mitigate impacts on food systems, poverty, and food insecurity (e.g., cash transfers, food aid, fertilizer subsidies, fiscal support, etc.)