Global Food Security in Times of Conflict, Covid, and Climate Change

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8. July 2022

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Food and Fertilizer

- Food segmented market
  but 6 bread baskets of the world
  (Ukraine, Russia, …)
  protect farmers

- Fertilizer integrated global market
Market Segmentation & Risk Insurance

- **Segmented market**
  \[
  \text{Harvest} \times \text{Price} = \text{Revenue}
  \]
  - low \times HIGH = Stable insures farmers
  - HIGH \times low

- **Integrated/global market**
  \[
  \text{Harvest} \times \text{Price} = \text{Revenue}
  \]
  - low \times low = Stable insures consumer
  - HIGH \times HIGH

- Close borders when others’ harvest is low
  open borders when own harvest is low
Resilience Enhancers

- Resilience enhancer: Substitutability
  - Transport infrastructure
  - Information sharing and coordination
    (global alliance for food security)
  - Ability to scale up production

- Change in eating habits given demographics:
  - Meat substitutes, vegetables, insects
  - Apps to monitor

- New technologies: vertical farming
Poll

1. What “C” is most challenging
   a. Climate change
   b. Covid
   c. Conflict (War in Ukraine)

2. What would make global food supply most resilient?
   a. Go for autarky (closing borders)
   b. Vertical farming
   c. Invest in infrastructure
   d. Use eco-friendly fertilizers/GMO food
   e. Change food habit (with apps)

3. Food shortage in a few months? (multiple answers)
   a. Will not be a big problem since it managed well
   b. Will lead to social unrest
   c. Will lead to migration movements
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Markus Brunnermeier
Transforming Global Food Systems in CCC Times

Johan Swinnen

International Food Policy Research Institute & CGIAR

July 2022
From June 2013...
Towards the end of hunger ... ?

From June 2013 ...
Towards the end of hunger ...

After June 2013 ...

Towards the end of poverty

- 2 Billion
- 1 Billion

IFPRI
Regional differences in food security

Millions of people facing severe and moderate food insecurity by region

Source: FAO
The world is not on track to eliminate hunger … and more challenges for food systems

Prevalence and number of undernourished worldwide

Source: FAO 2020; IFPRI 2021
**Triple burden of malnutrition**

Coexistence of **undernutrition, micronutrient deficiencies, and overweight and obesity**

Countries with both undernutrition and overweight, 2010

- **3 billion** people cannot afford a healthy diet
- **2 billion** people have micronutrient deficiencies
- **2 billion** people are overweight or obese
- **A third** of LMI countries face undernutrition and obesity

Source: Popkin et al. 2020

Source: Ruel 2019, Leroy 2019, Van Wesenbeeck et al. 2018
Burdens of Malnutrition
Evidence from Nigeria

Nigerian’s food consumption composition compared to EAT-Lancet global reference diet

- Nigeria faces multiple nutrition challenges.
- 35 percent of children are stunted while
- 21 million Nigerians over age 15 are overweight.

Source: Ecker et al. 2021
Food system pressures planetary boundaries

The global food system consumes >30% of energy and produces >20% of GHG emissions

Source: EAT-Lancet Report 2019
Climate change and food security

Prevalence and number of undernourished worldwide

Source: FAO 2020

Average global temperature anomaly

Source: Our World in Data-Hadley Centre 2020
Economic growth and food security

Prevalence and number of undernourished worldwide

GDP growth per capita (annual %)

Source: World Bank 2020
Source: FAO 2020
Economic growth and food security

TFP Growth

Across World’s Regions: East Asia, South East Asia, South Asia, ME and SSA

GDP growth per capita (annual %)

Source: World Bank 2020

Source: Keith Fuglie – presented by Uma Lele
Conflict and food security

Prevalence and number of undernourished worldwide

Forcibly displaced people worldwide

Source: FAO 2020

Source: UNHCR 2019, 2020
**CCC (Conflict, Climate, Covid) and Food Crises**

Over 155 million people across 50 countries experiences a food crisis or worse (IPC/CH Phase 3 or above) in 2020

Conflicts were the primary driver of food crisis in 2020 even accounting for economic effects of COVID-19

<table>
<thead>
<tr>
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<th>2018</th>
<th>2019</th>
<th>2020</th>
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<tbody>
<tr>
<td>Conflict/insecurity</td>
<td>73.9M</td>
<td>77.1M</td>
<td>99.1M</td>
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<tr>
<td></td>
<td>21 countries</td>
<td>22 countries</td>
<td>23 countries</td>
</tr>
<tr>
<td>Weather events</td>
<td>28.7M</td>
<td>33.7M</td>
<td>15.7M</td>
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<td></td>
<td>26 countries</td>
<td>25 countries</td>
<td>15 countries</td>
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<tr>
<td>Economic shocks</td>
<td>10.2M</td>
<td>23.9M</td>
<td>40.5M</td>
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<tr>
<td></td>
<td>6 countries</td>
<td>8 countries</td>
<td>17 countries</td>
</tr>
</tbody>
</table>

However, the causes of food crisis are often closely interlinked

Source: Global Report on Food Crisis 2021, FSIN, GRFC May 2021
COVID-19 impacts on global poverty and nutrition

Impact on Global POVERTY

Impact on Global NUTRITION

Source: Laborde, Martin and Vos, 2020
Poor people’s food and nutrition security is disproportionately affected by COVID-19

1. They spend a large share of their income on food
2. Their main production factor and asset is physical labor
3. COVID causes more disruptions in their (private) food value chains – since more labor-intensive
4. Public social and nutrition programs are disrupted (more important for them)
5. Less access to health services
6. Especially vulnerable: children, women, (ex-)migrants
COVID-19 impacts on inequality in food systems
Survey results from Ethiopia

Poor people suffer more from INCOME declines

% of households that have much lower incomes, 2020

% of households consuming dairy products, 2020

COVID-19 disrupted Public Services and Food Programs - 1

Changes in Service Utilization Among Mothers in Uttar Pradesh (India)

Source: Diao and Wang 2020
COVID-19 disrupted Public Services and Food Programs - 2

Pre- and post-COVID food security indicators across households with and without access to school feeding programs - Nigeria

### Pre-COVID

- **Skip a meal**:
  - Households with school feeding service: 20%
  - Household without school feeding services: 30%
- **Run out of food**:
  - Households with school feeding service: 30%
  - Household without school feeding services: 40%
- **Went without eating for a day**:
  - Households with school feeding service: 10%
  - Household without school feeding services: 15%

### Post-COVID

- **Skip a meal**:
  - Households with school feeding service: 60%
  - Household without school feeding services: 70%
- **Run out of food**:
  - Households with school feeding service: 50%
  - Household without school feeding services: 60%
- **Went without eating for a day**:
  - Households with school feeding service: 25%
  - Household without school feeding services: 30%

Source: Abay et al 2021
Scaling and sustaining social protection under COVID-19

Distribution of policy types within social protection

- Food aid: 30%
- Cash transfers: 19%
- Food price controls: 11%
- Utility bill support: 8%
- Unemployment benefits: 6%
- Mandated grace period of utility bill: 9%
- Others: 3%
- Wage support: 13%

Share of social protection policies targeted to specific populations

- Low income: 25%
- Youth: 8%
- Informal workers: 7%
- Disabled: 4%
- Women: 3%
- Elderly: 3%

Source: Calculated from IFPRI (2020).

Note: The "Others" category includes such policies as expanded credit options, rent support, consumer food subsidies, pension increase, and school fee waivers.
Women are especially vulnerable

Gendered impacts of COVID-19

- **Health** measures affect women and men differently in developing countries, particularly in rural areas.
- **Income shocks** also have gendered impacts.
- Impact on women’s **empowerment** and children’s **schooling** could affect female labor force participation in the next generation, also violence-related services.

Gender-sensitive policy responses

- **Adapt** existing policies and social protection to account for gender implications.
- Improve **program targeting** for women.
- Utilize accessible **delivery mechanisms**.
- **Complementary programming** in food and nutrition, water and sanitation, maternal health, etc.

Trade and Value Chains are crucial for food security and for dealing with shocks and climate change

Food and trade policies need to support rather than hamper

Source: Gouel and Laborde 2018
Restructuring supply chains and food systems

- **Heterogeneity:**
  - Global -- local
  - Labor -- capital intensity
  - Large -- small-scale
  - Short -- long run
  - Staples -- perishables

- **Many innovations** to overcome restrictions
  - *E.g. Digital growth:* e-commerce & ICT solutions like *FoodPanda*
  - Cloud Kitchens, *Meituan*

Supply disruptions versus income and employment
Survey evidence from Myanmar

Despite disruptions, food supply chains adjusted relatively well to meet demand.

Household income and job loss were most severe impact.
COVID-19 impacts: Rural vs Urban

Changes in GDP along the Value Chain (%) in Indonesia

- Total AgriFood Farmin g Process ing: -18%
- Services: -14%
- Food: -92%

Inequality in Poverty (% points – average per month of lockdown)

Indonesia: National 13.3, Rural 12.6, Urban 14.0
Nigeria: National 12.2, Rural 10.7, Urban 15.0

Shocks and Trade Restrictions

Number of countries implementing food export restrictions

Evolution of the share of global trade, in calories, impacted by export restrictions

Daily update. Includes food, feed and other uses of food products.

- Ukraine Crisis [2022]
- Covid-19 [2020]
- Food Price Crisis [2008]

X-axis shows the week of the year. 1 = first week of the year.

Chart: David Laborde - Source: IFPRI
Food prices were high (and stocks low(er)) before war in Ukraine

Russia and Ukraine are key players in global markets for cereals & sunflower/oil

<table>
<thead>
<tr>
<th></th>
<th>Russian Federation</th>
<th>Ukraine</th>
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<tbody>
<tr>
<td>Barley</td>
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<td>12.6</td>
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<tr>
<td>Maize</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>Sunflower</td>
<td>19.6</td>
<td>4.3</td>
</tr>
<tr>
<td>Sunflower Oil</td>
<td>23.1</td>
<td>49.6</td>
</tr>
<tr>
<td>Wheat</td>
<td>24.1</td>
<td>10</td>
</tr>
</tbody>
</table>

Russia 5.8% Global Market Share in Calories
Ukraine 6% Global Market Share in Calories

Intra-EU trade excluded from computations.
Chart: David Laborde • Source: COMTRADE

https://www.ifpri.org/blog/how-will-russias-invasion-ukraine-affect-global-food-security
Ukraine-Russia war immediate food impact

Share of the Russian Federation & Ukraine in imported calories

Cereal Price Indexes (January 2020=100)

EU countries are considered as one market.
Map: David Laborde • Created with Datawrapper
Example: Egypt

Egypt's wheat imports, Million metric tons

Breakdown by exporter

- Other Exporters
- Russian Federation
- Ukraine

Chart: David Laborde • Source: COMTRADE • Created with Datawrapper
High prices may be more challenging now
Price shocks “the new normal’?

- The poor are still recovering from COVID crisis
- Hunger and malnutrition were on the rise
- Cash strapped governments have little room to maneuver
- It is unclear how long current challenges will persist

Source: Headey and Hirvonen IFPRI Blog March, 2022
Shocks and Volatility: How to enhance resilience and inclusion?

- Measures to **limit** the frequency and magnitude of shocks.

- Measures to be **informed and anticipate** the shock

- Measures to **absorb** the shock

Resilience and **inclusion** are intrinsically linked
Longer term effects: Input prices and the next harvests

Fertilizer and Fuel Prices

Percentage of the Russian Federation and Belarus in potassium fertilizer imports by country

Map: David Laborde • Source: COMTRADE • Created with Datawrapper
Longer term effects: Input prices and the next harvests

Global markets of fertilizers in 2019

Market shares of main exporters and total amount of traded nutrients in metric tons.

Global production of N is estimated at 123 mio MT, of P2O5 44 mio MT, and of K2O 44 mio MT.

Chart: David Laborde • Source: FAOSTAT
Longer term effects: Input prices and the next harvests

Prices for food, fertilizer and energy

Index based on constant USD prices. Base 100 = Average 2010-2020

- Energy
- Fertilizers
- Food

2011 food price crisis

China starts export restrictions on fertilizers

Russian invasion

European natural gas price reached a five-year lowest level

2008 food price crisis


https://www.ifpri.org/blog/high-fertilizer-prices-contribute-rising-global-food-security-concerns
What is more important for food security? Food, oil or fertilizer prices?

Yi et al. (2020): coverage of 90 percent of the global economy, incl all large LMICs: farm share of food expenditures = 27% on average in 2015

Source: Barrett, Reardon, Swinnen, Zilberman, JEL, 2022
2022 Country Vulnerability

Composite Index
- Exposure to Black Sea supply
- Food import dependency
- Macroeconomic vulnerability
- Fertilizer import dependency
- Local food market dynamics

Assessment based on March 28th 2022 data
Map: David Laborde
From June 2013 ...

A temporary hiccup or structural reversal?

Undernourishment in Developing Countries (%)
Thank you for your attention.
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  • Excessive Food Price Volatility Early Warning System
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  • Vulnerability Dashboard
  • Fertilizer Market Dashboard