



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

$$\underline{\text{Harvest}} \times \text{Price} = \text{Revenue}$$

low HIGH
HIGH low

Stable → insures farmers

■ Integrated/global market

$$\underline{\text{Harvest}} \times \underline{\text{Price}} = \text{Revenue}$$

low low
HIGH Stable

→ insures consumer

- 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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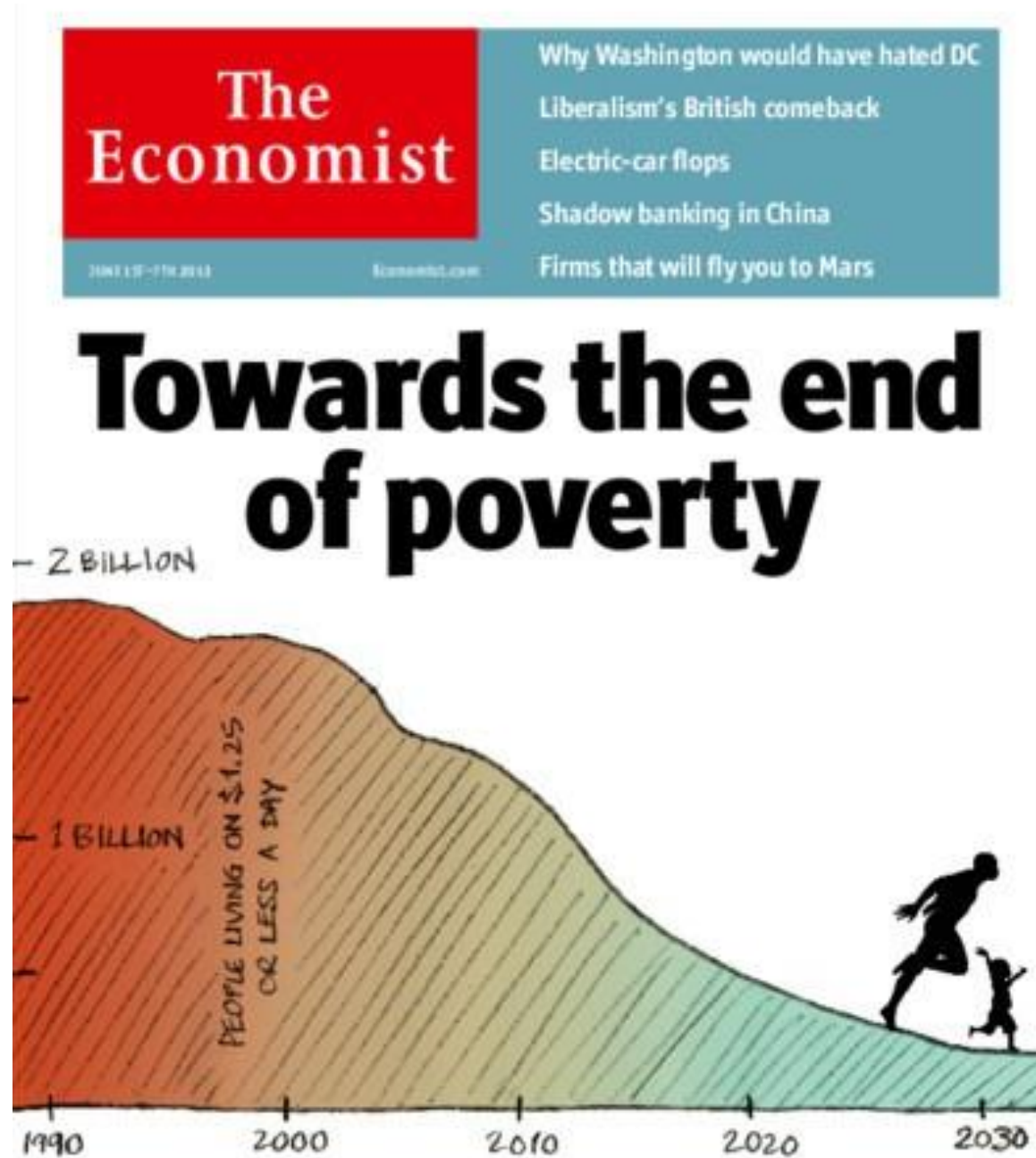
Transforming Global Food Systems in CCC Times

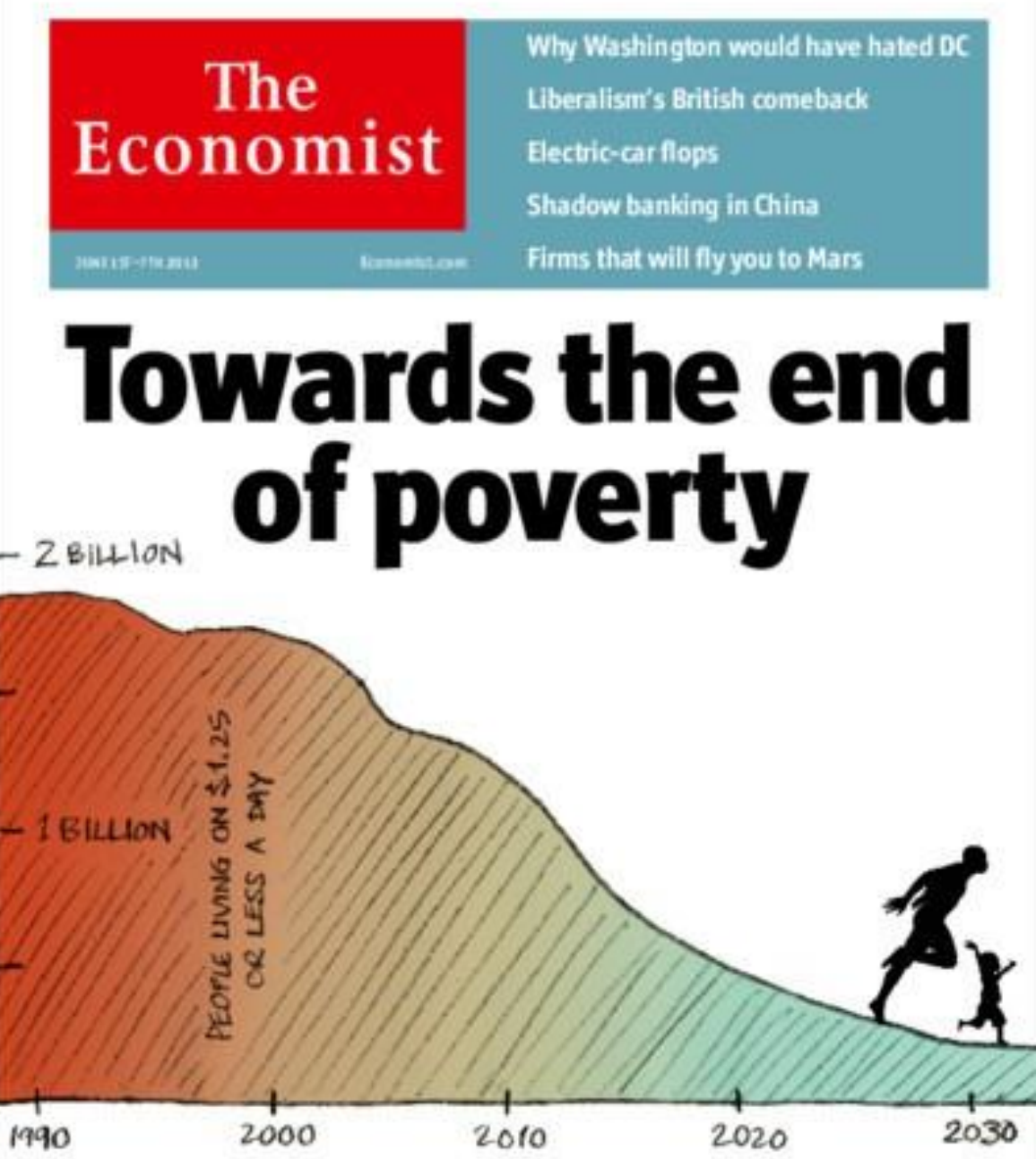
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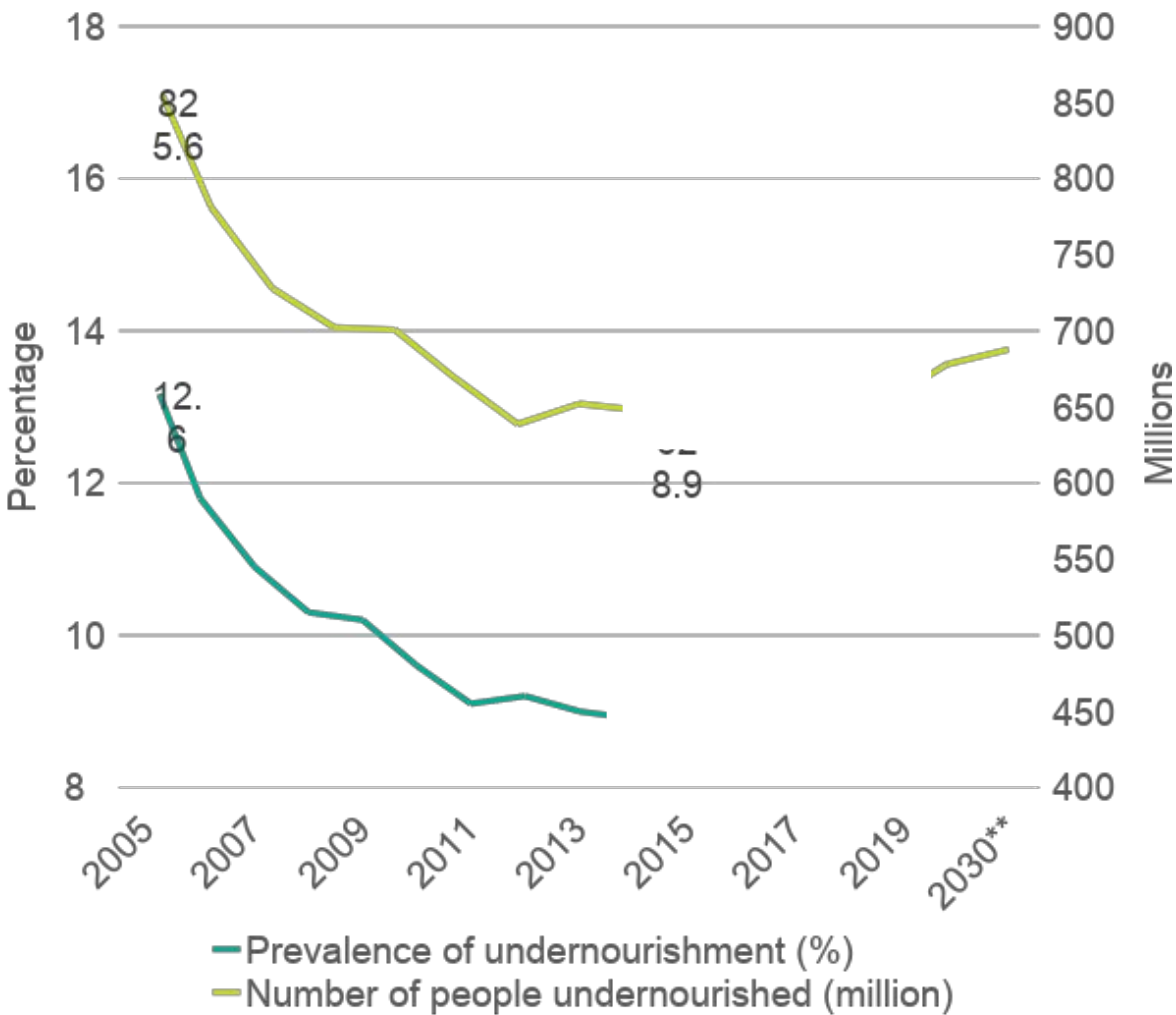
July 2022

From June 2013 ...

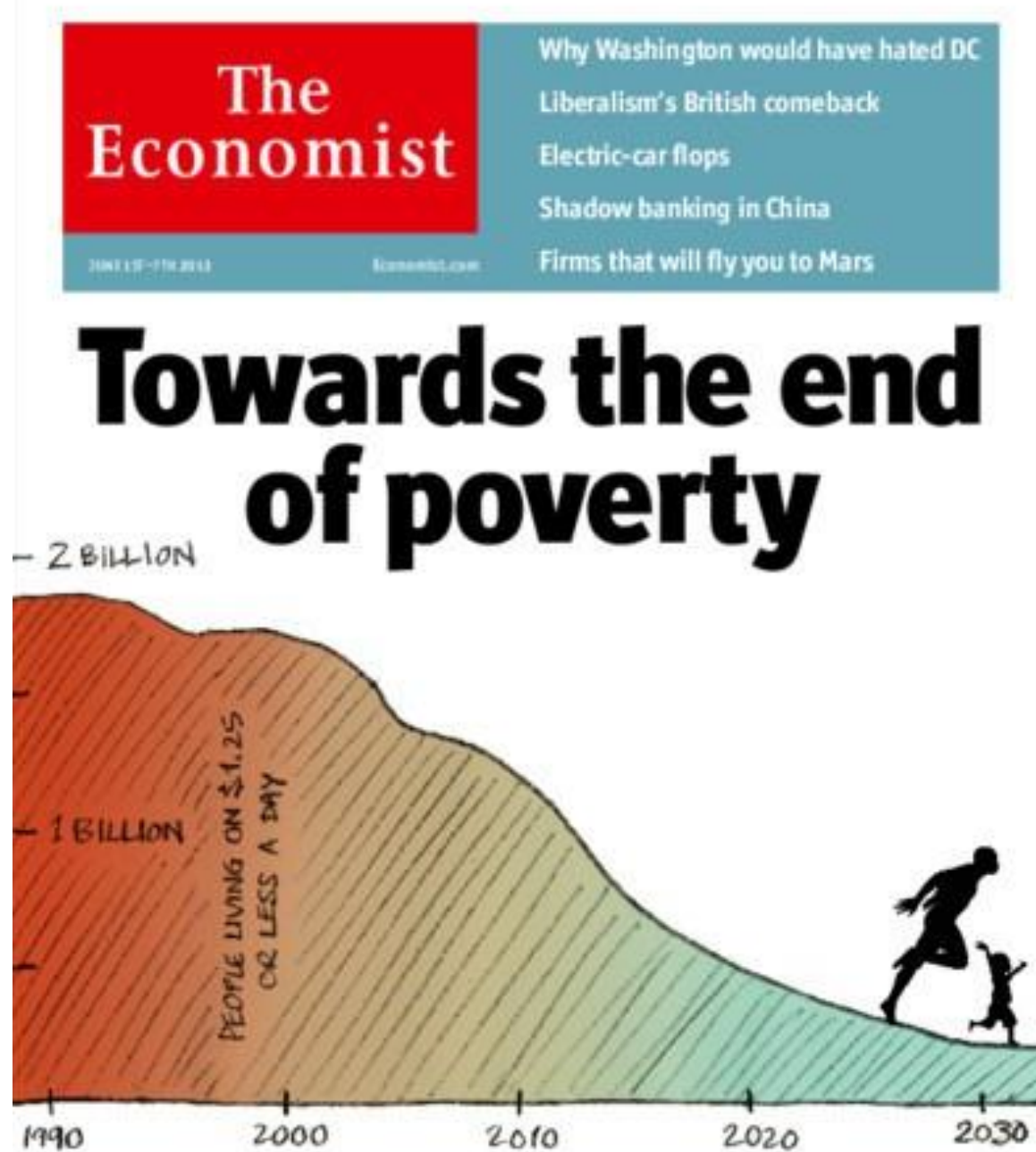




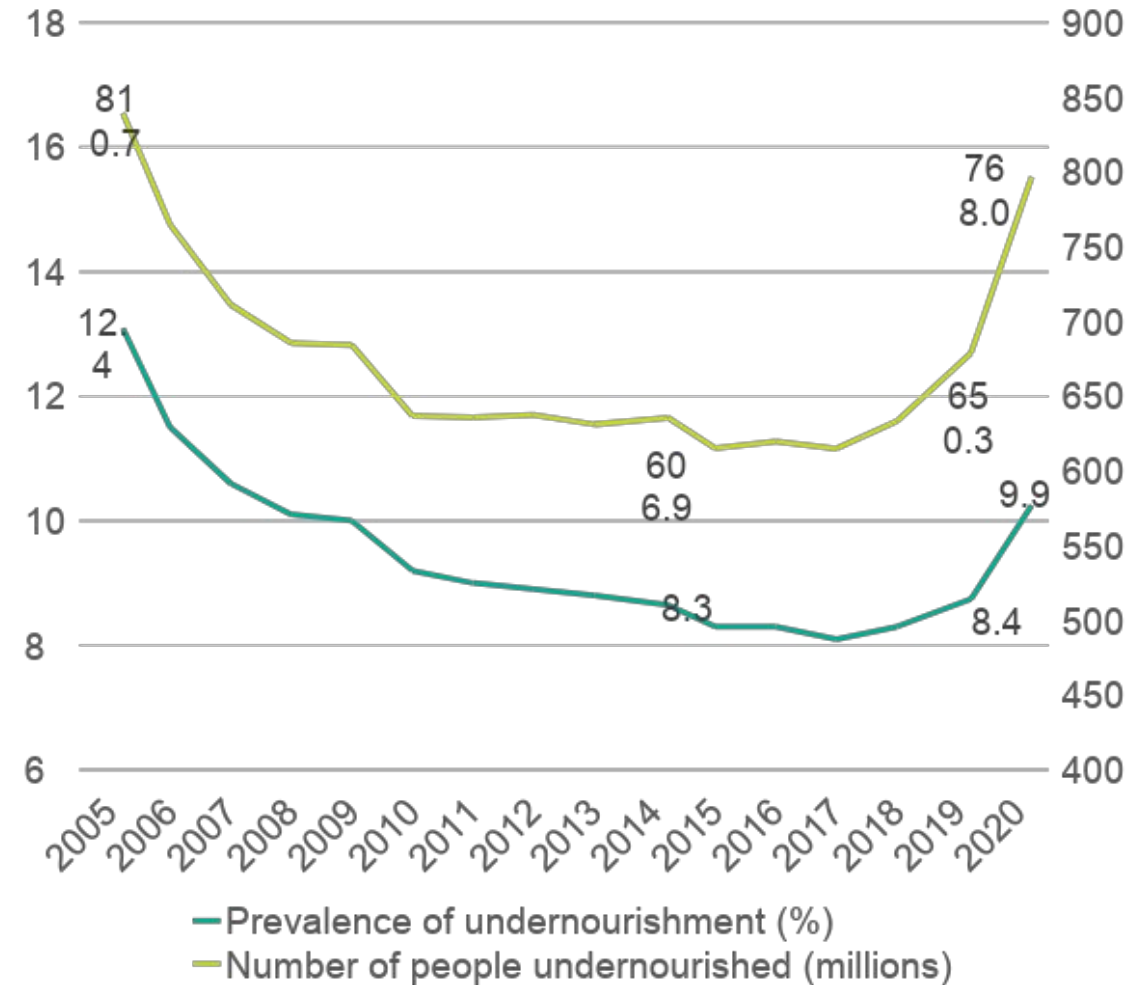
Towards the end of hunger ... ?



After June 2013 ...

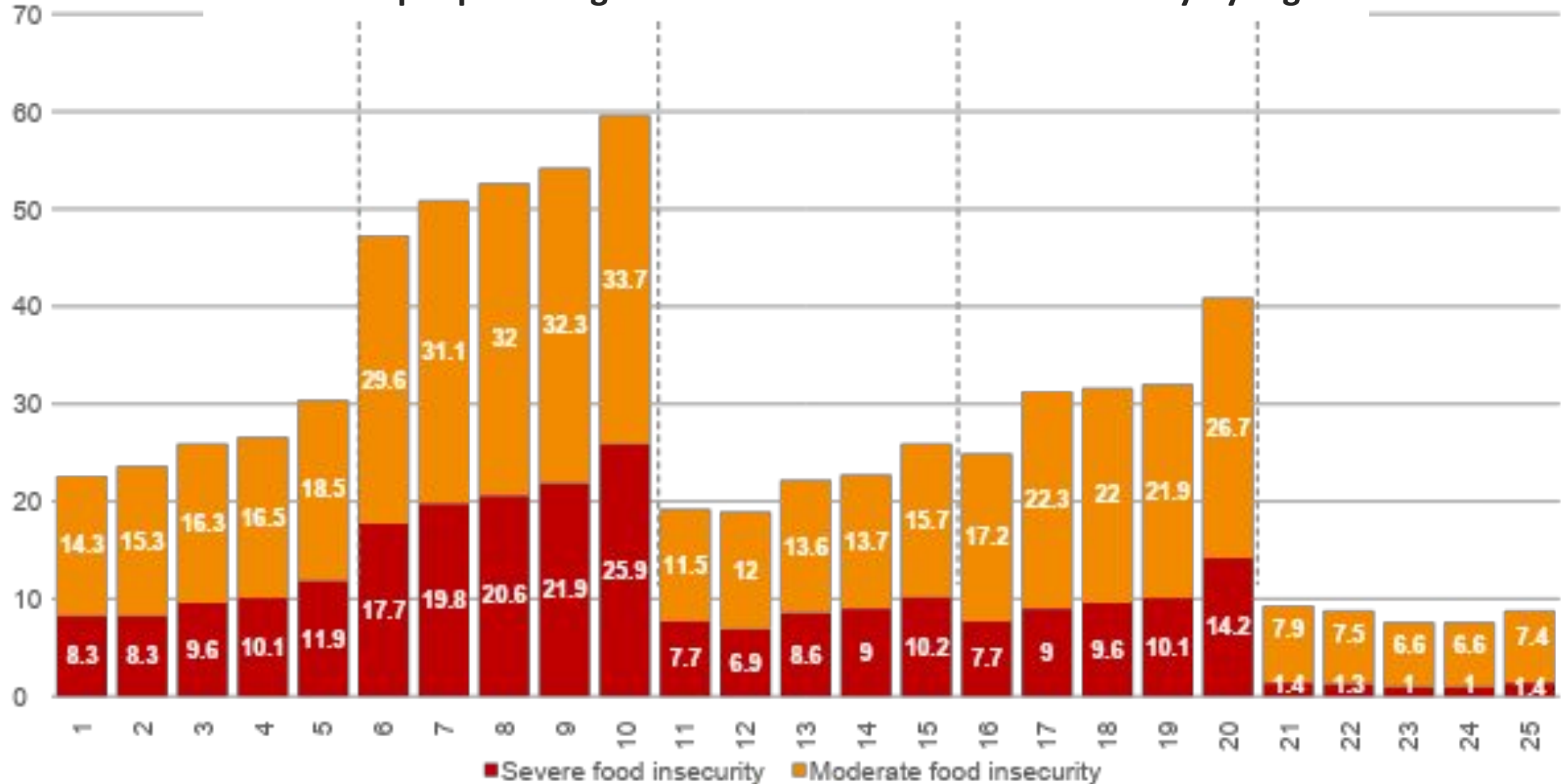


Towards the end of hunger ... ?



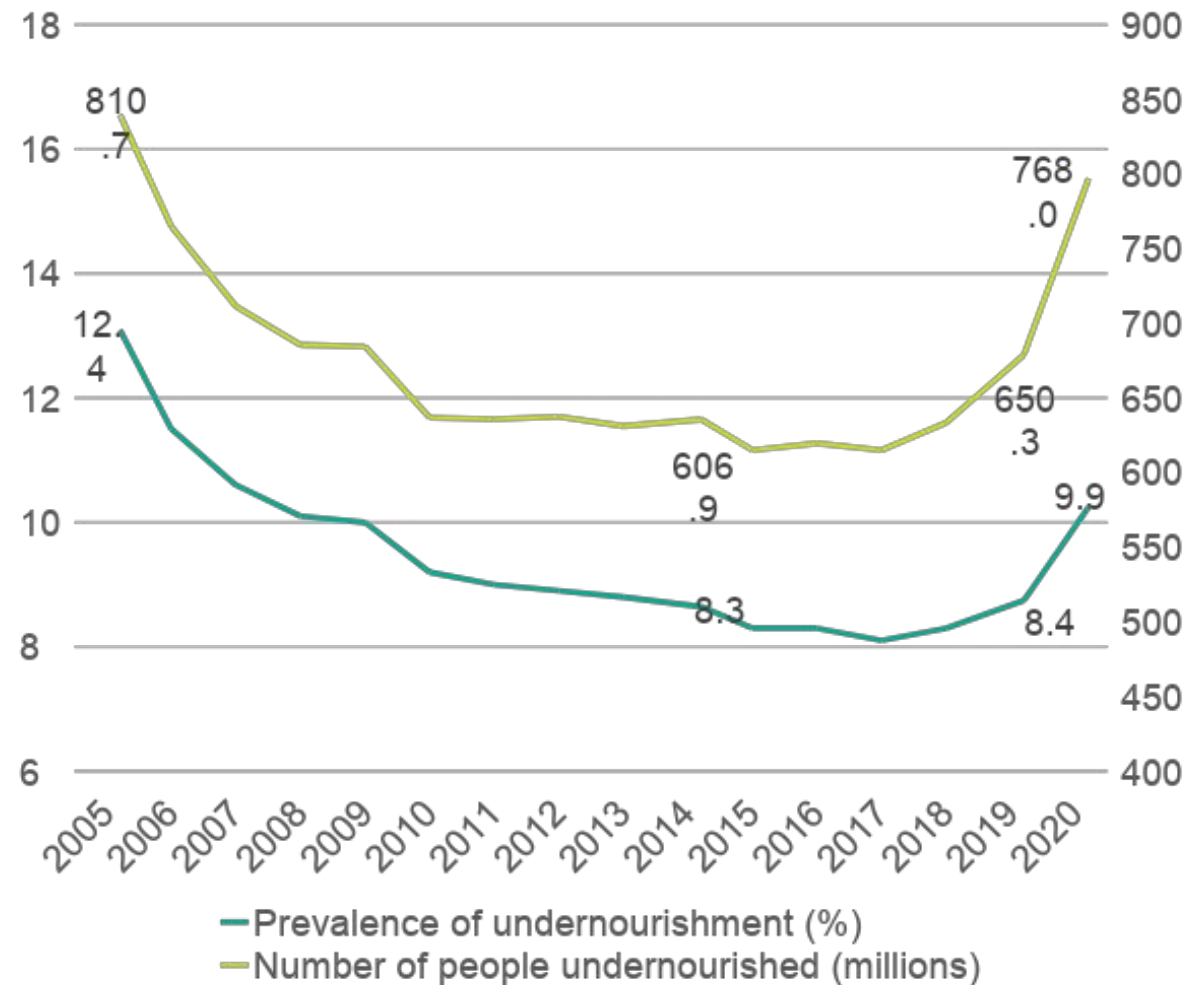
Regional differences in food security

Millions of people facing severe and moderate food insecurity by region



The world is not on track to eliminate hunger ... and more challenges for food systems

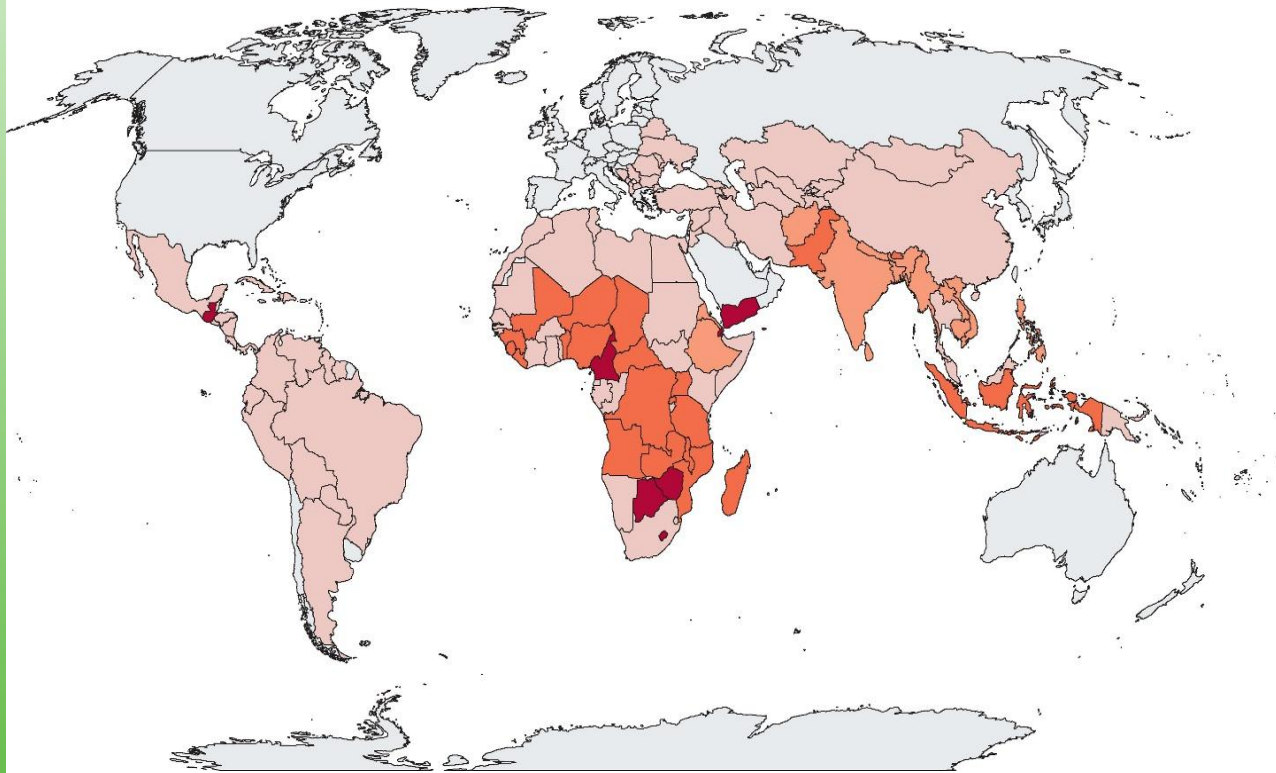
Prevalence and number of undernourished worldwide



Triple burden of malnutrition

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

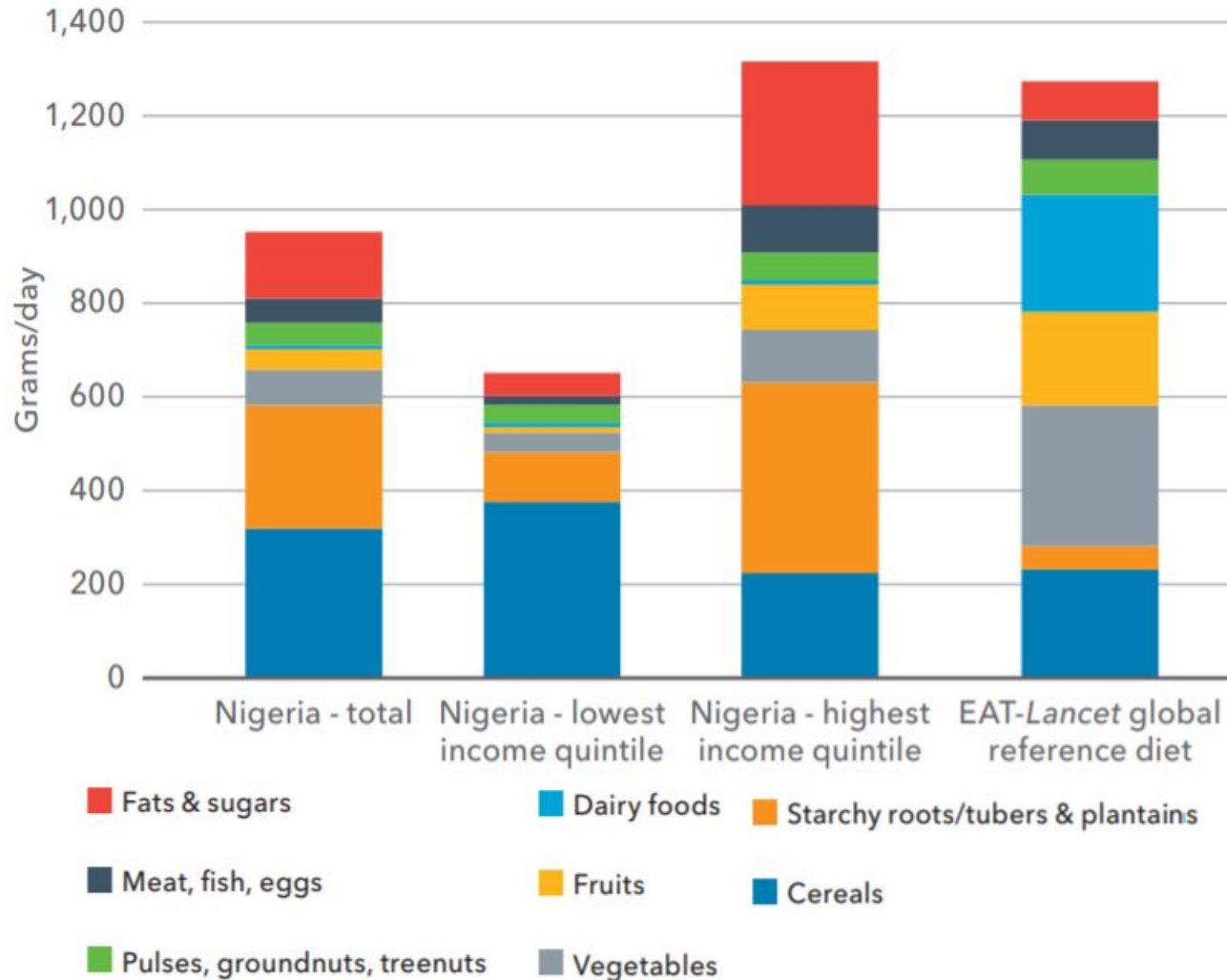
Countries with both undernutrition and overweight, 2010



- **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**

Burdens of Malnutrition Evidence from Nigeria

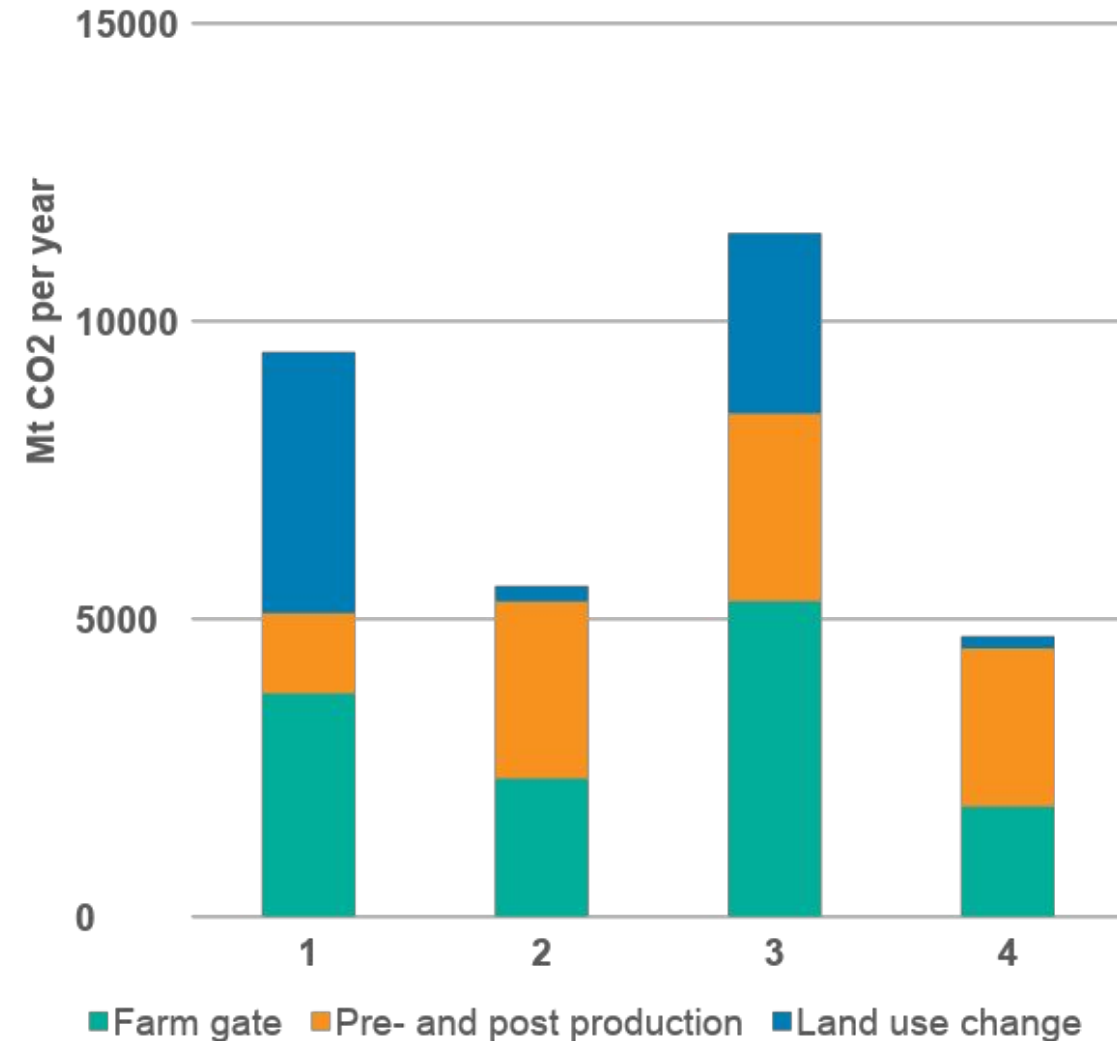
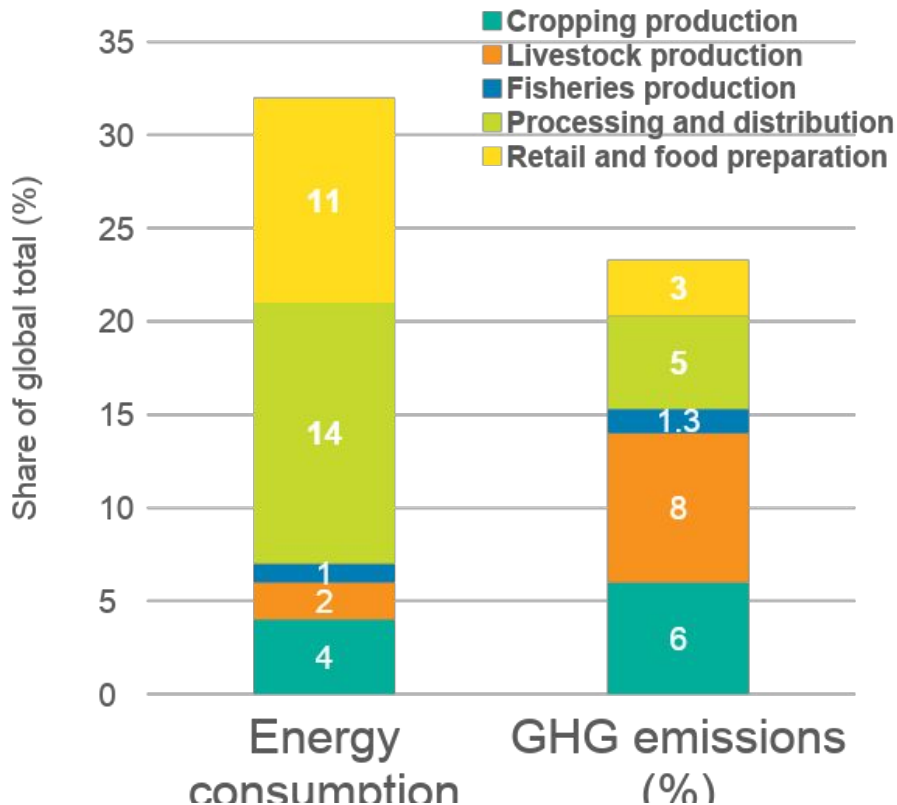
Nigerian's food consumption composition compared to EAT-Lancet global reference diet



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

Food system pressures planetary boundaries

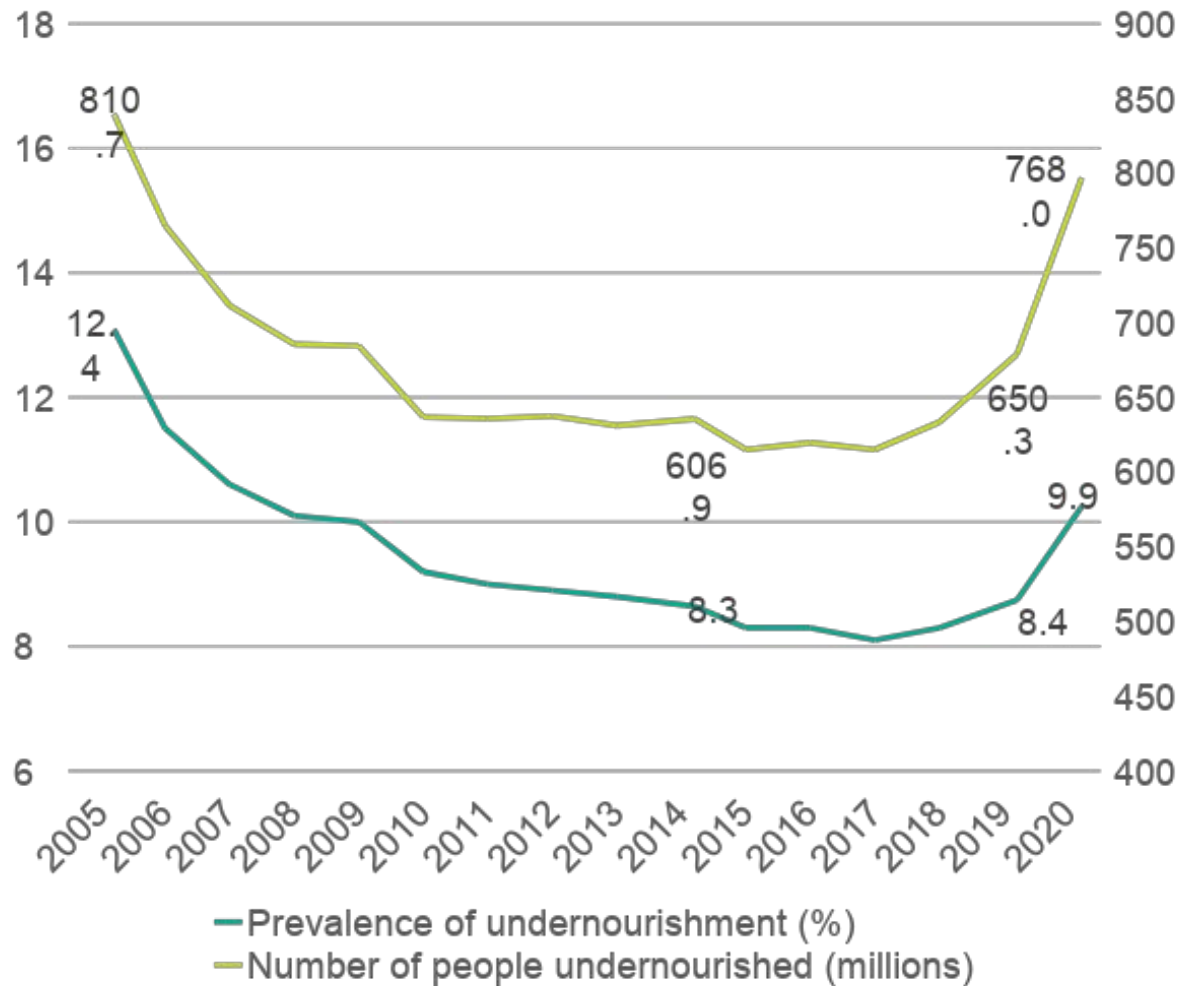
The global food system
consumes **>30% of energy** and
produces **>20% of GHG** emissions



Source: EAT-Lancet Report 2019

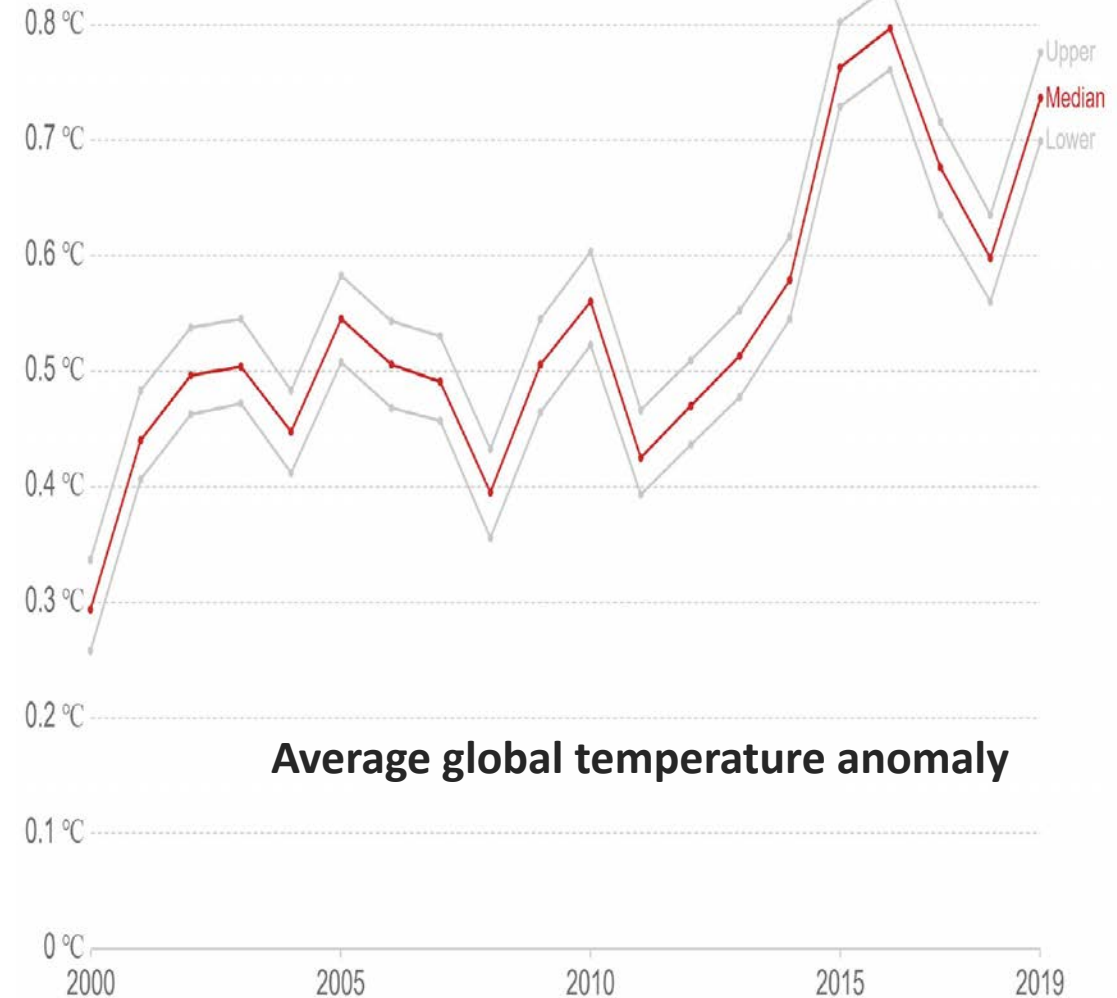
Climate change and food security

Prevalence and number of undernourished worldwide



Source: FAO 2020

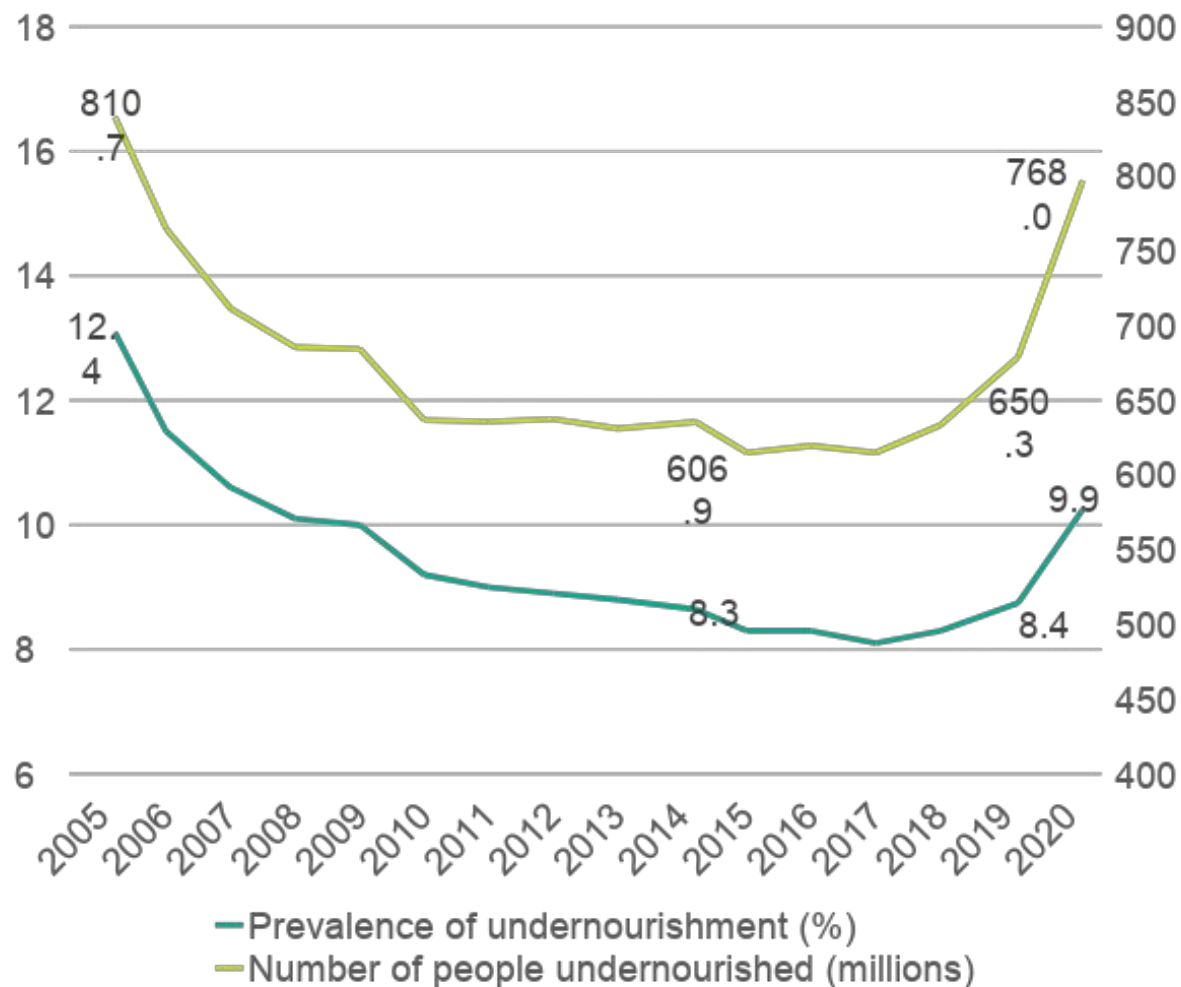
Global average land-sea temperature anomaly relative to the 1961-1990 average temperature.



Source: Our World in Data-Hadley Centre 2020

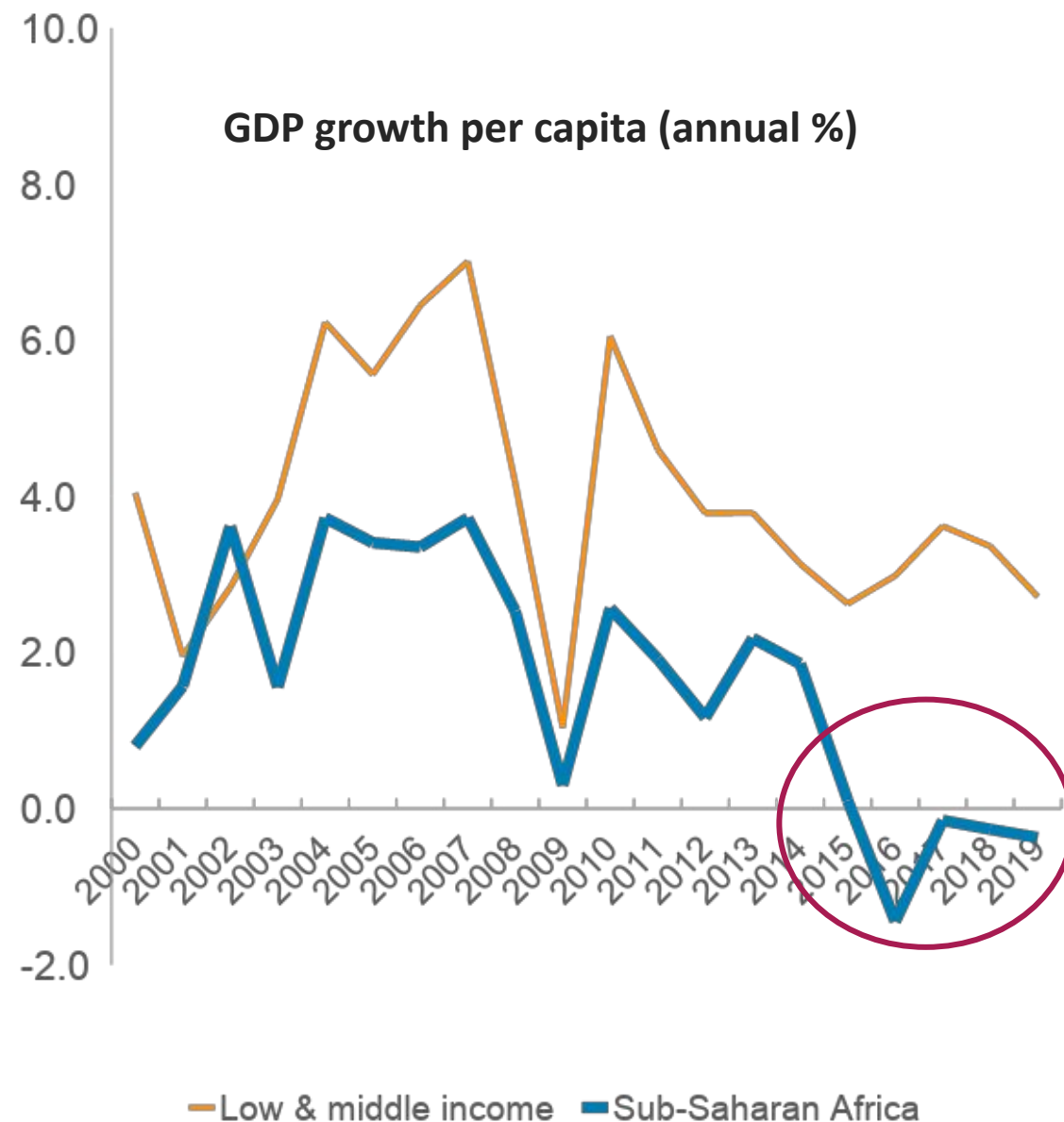
Economic growth and food security

Prevalence and number of undernourished worldwide



Source: FAO 2020

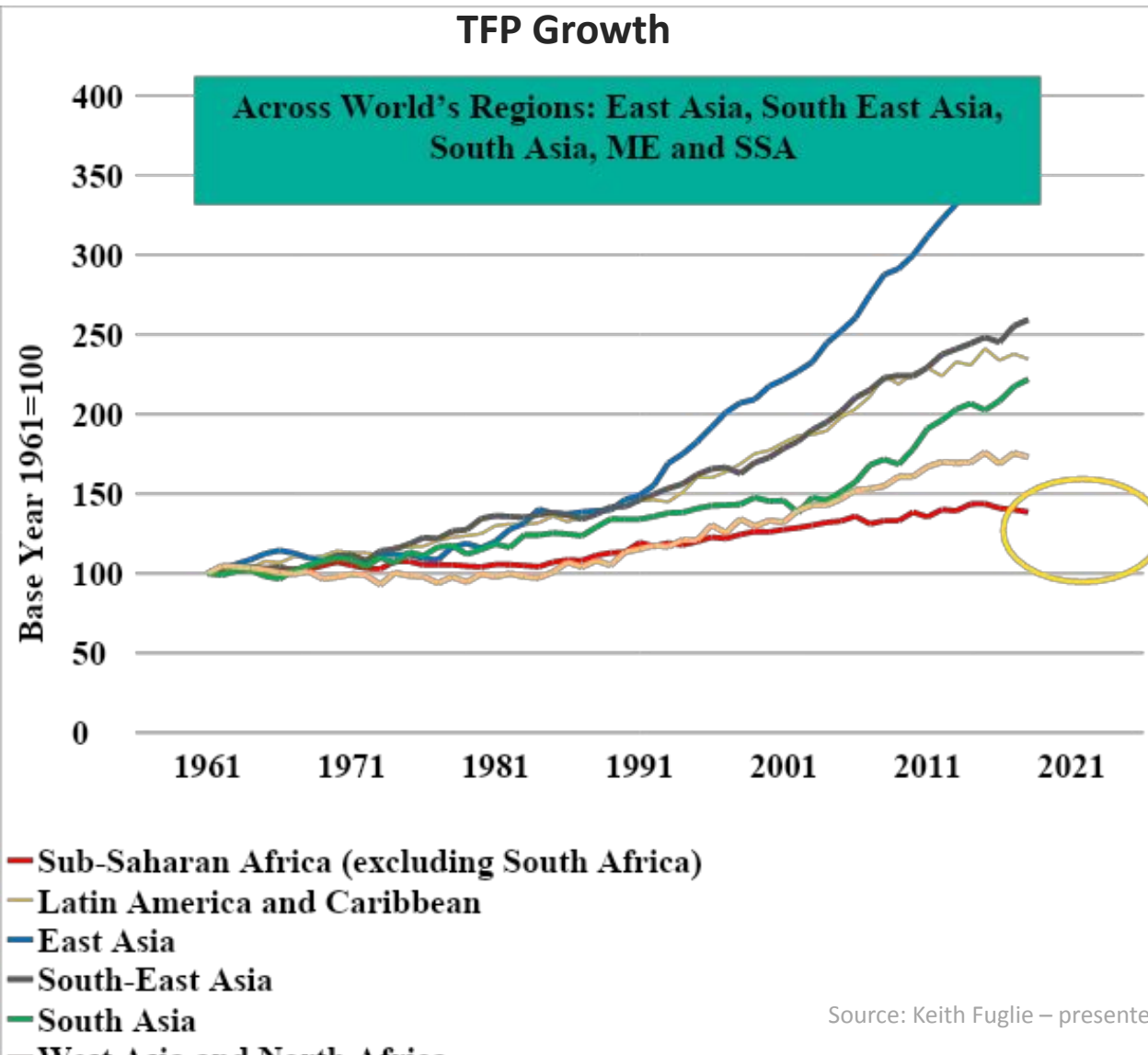
GDP growth per capita (annual %)



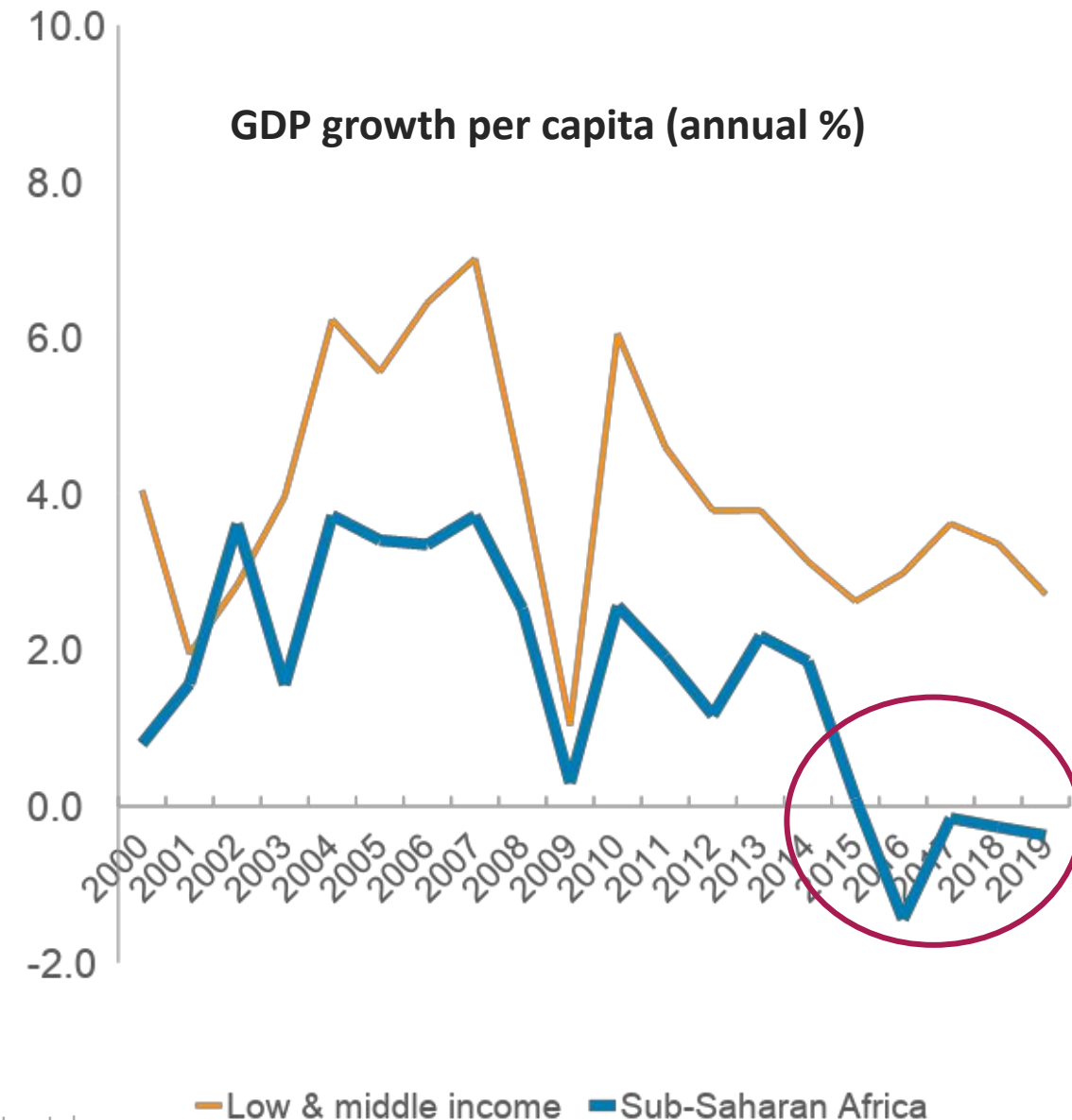
Source: World Bank 2020

Economic growth and food security

TFP Growth



GDP growth per capita (annual %)

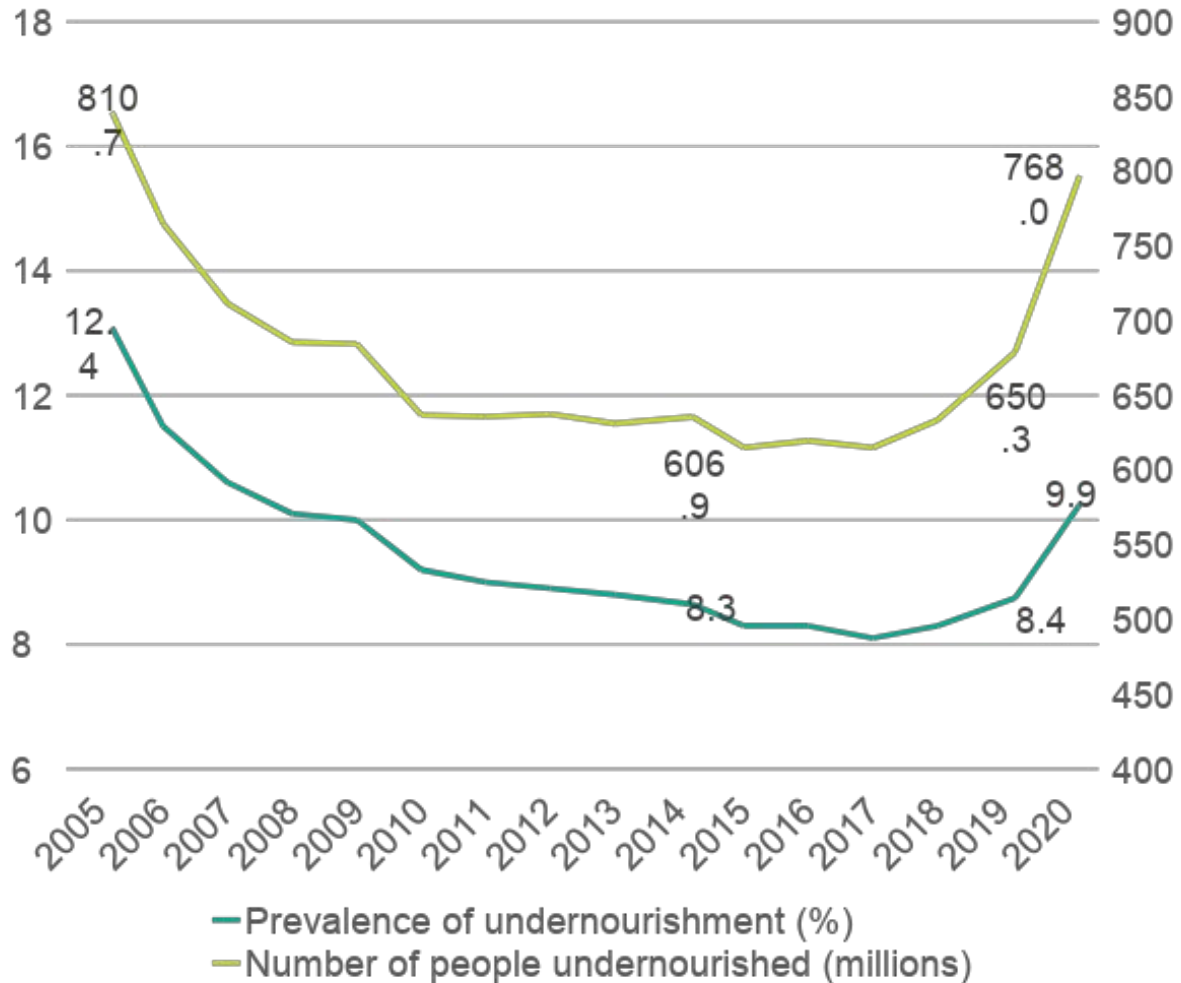


Source: Keith Fuglie – presented by Uma Lele

Source: World Bank 2020

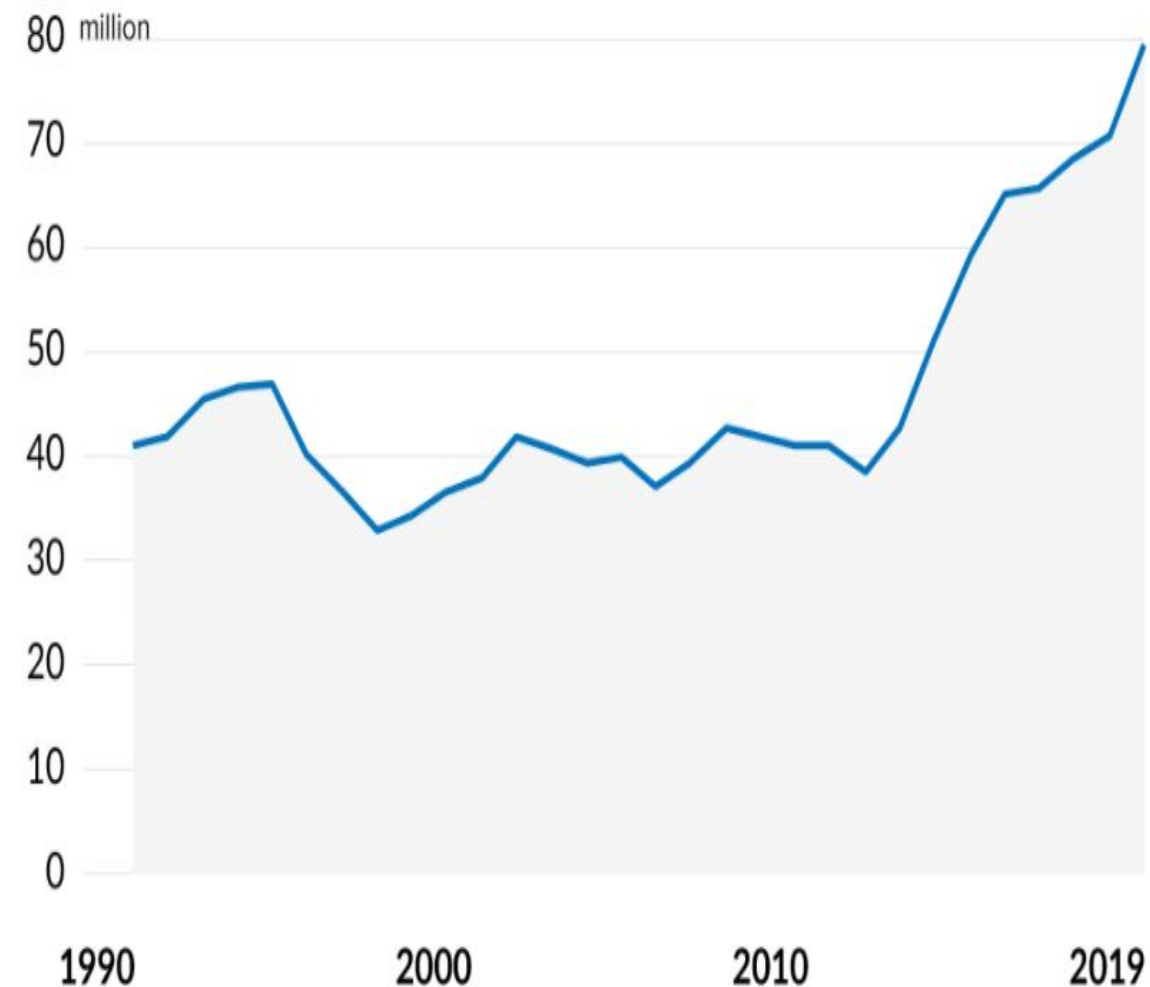
Conflict and food security

Prevalence and number of undernourished worldwide



Source: FAO 2020

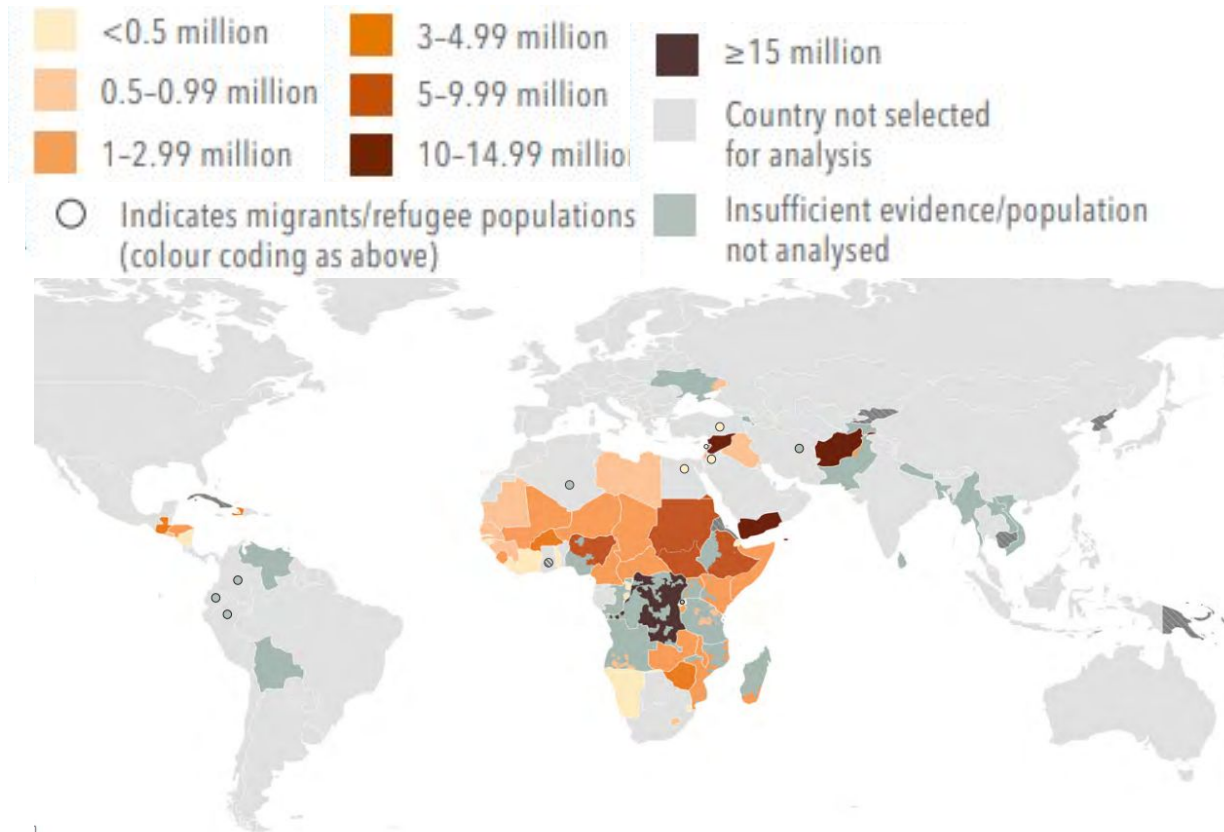
Forcibly displaced people worldwide



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



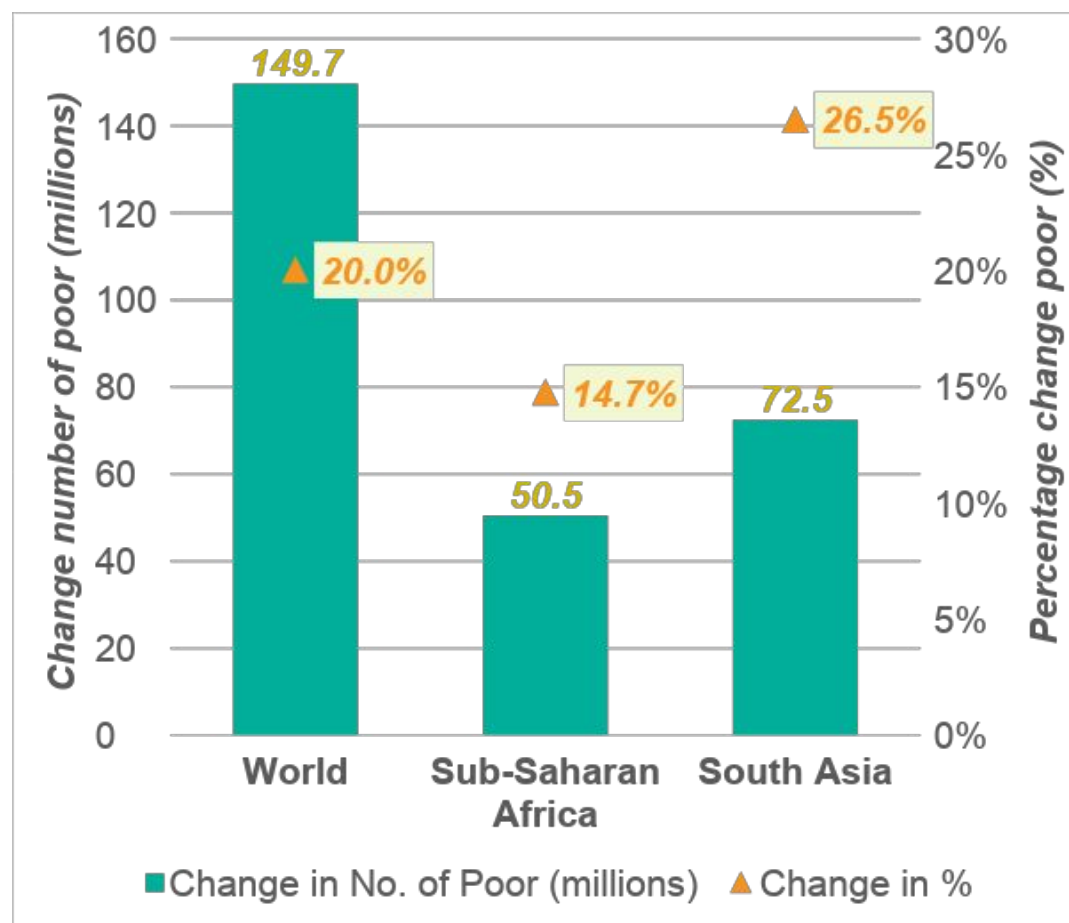
Conflict was the primary driver of food crisis in 2020 even accounting for economic effects of COVID-19

	2018	2019	2020
Conflict/insecurity	73.9M 21 countries	77.1M 22 countries	99.1M 23 countries
Weather events	28.7M 26 countries	33.7M 25 countries	15.7M 15 countries
Economic shocks	10.2M 6 countries	23.9M 8 countries	40.5M 17 countries

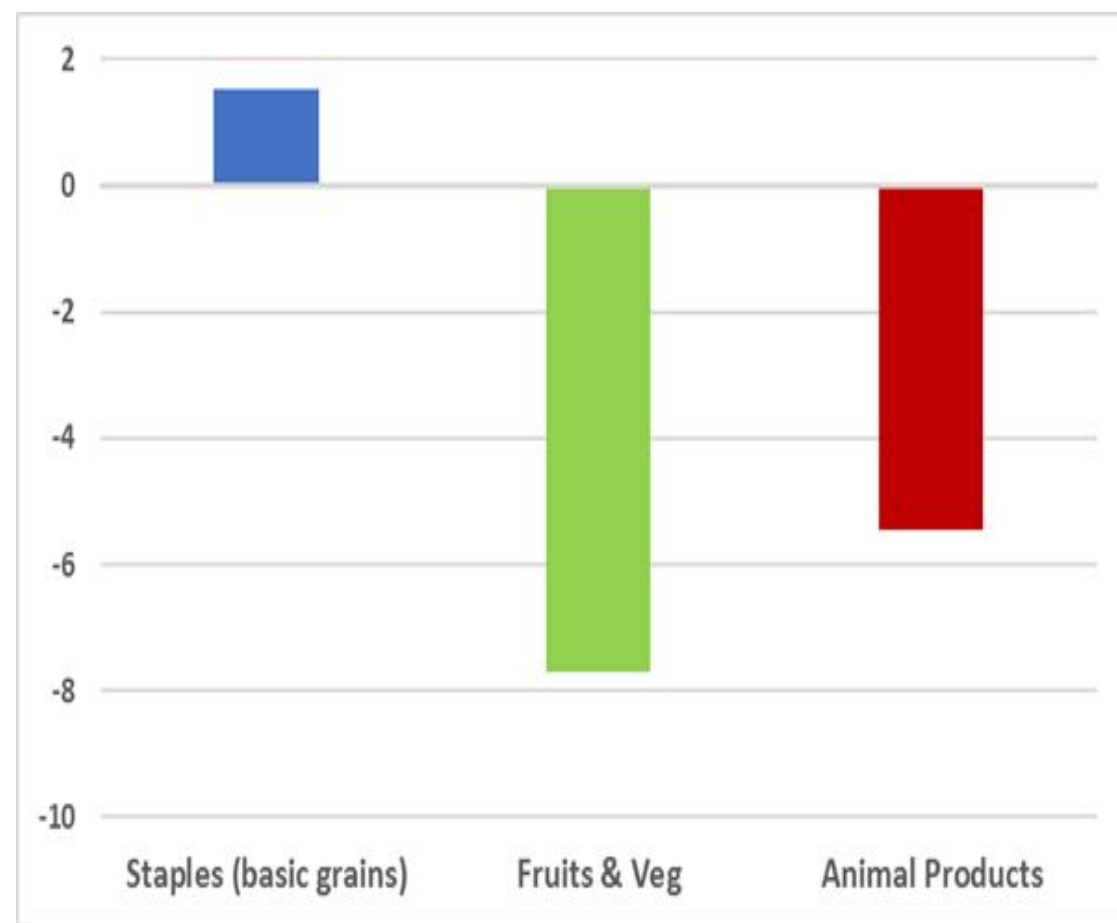
However, the causes of food crisis are often closely interlinked

COVID-19 impacts on global poverty and nutrition

Impact on Global POVERTY



Impact on Global NUTRITION



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**

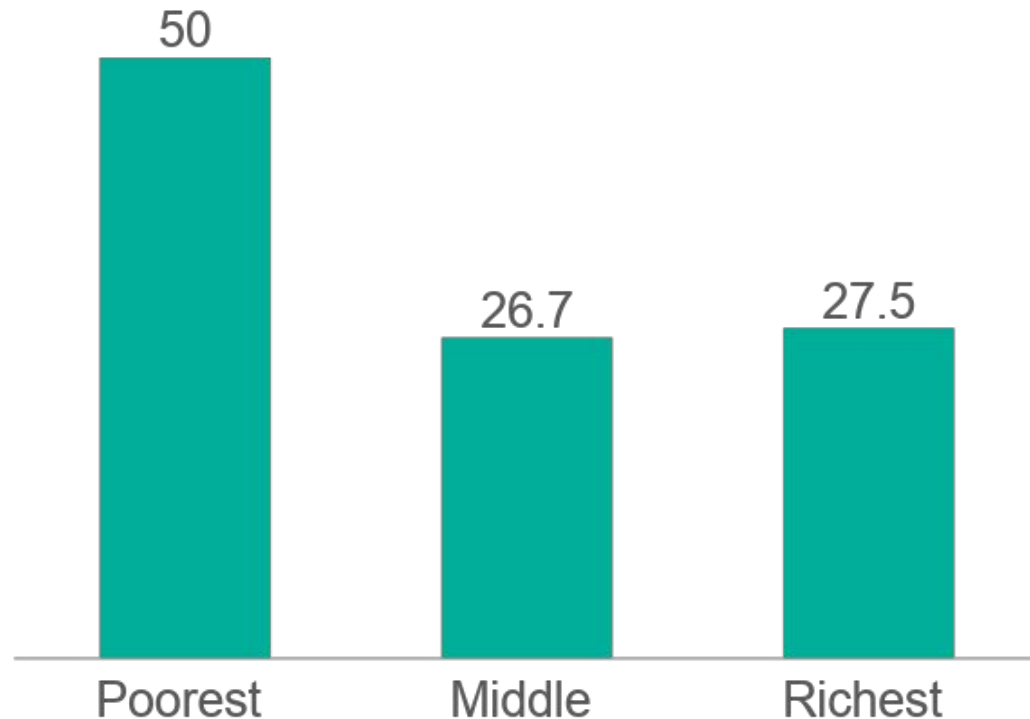


COVID-19 impacts on inequality in food systems

Survey results from Ethiopia

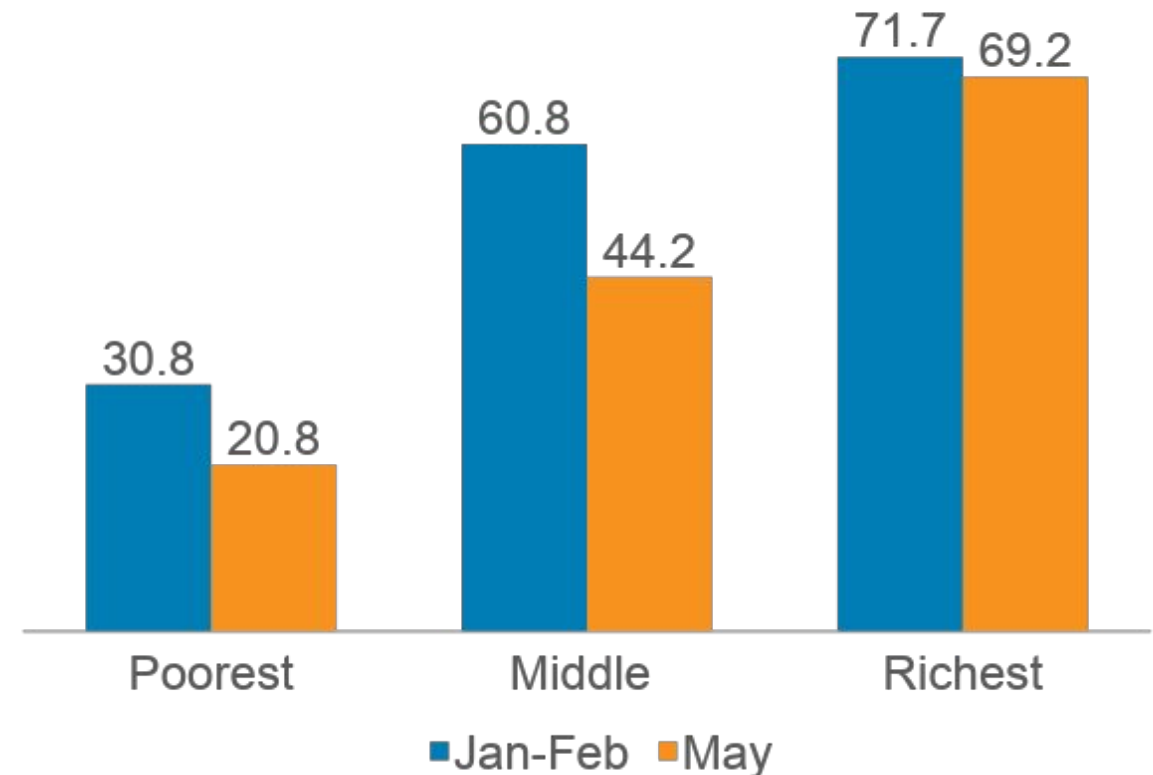
Poor people suffer more
from **INCOME** declines

% of households that have much lower incomes, 2020



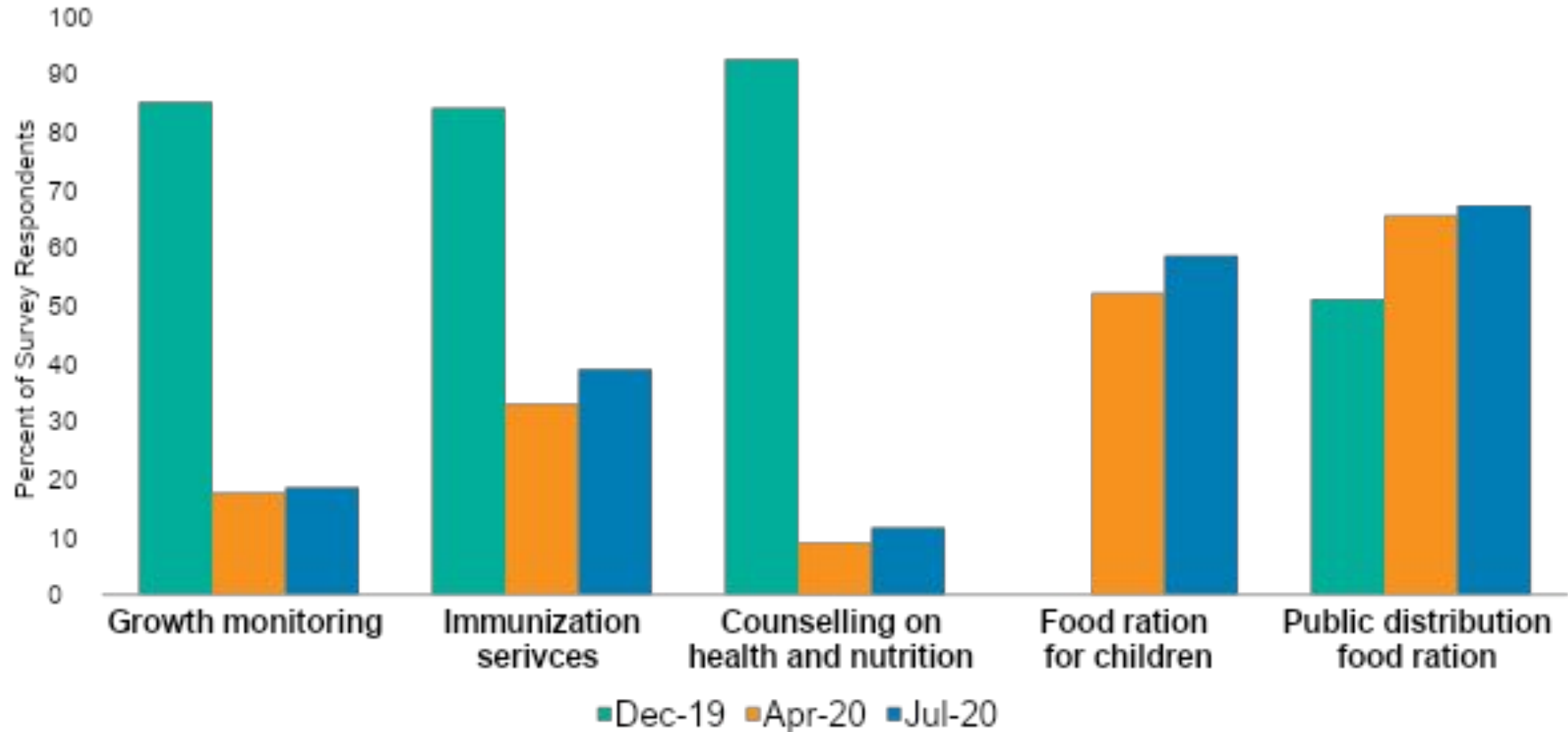
Poor people suffer more from
NUTRITION effects

% of households consuming dairy products, 2020



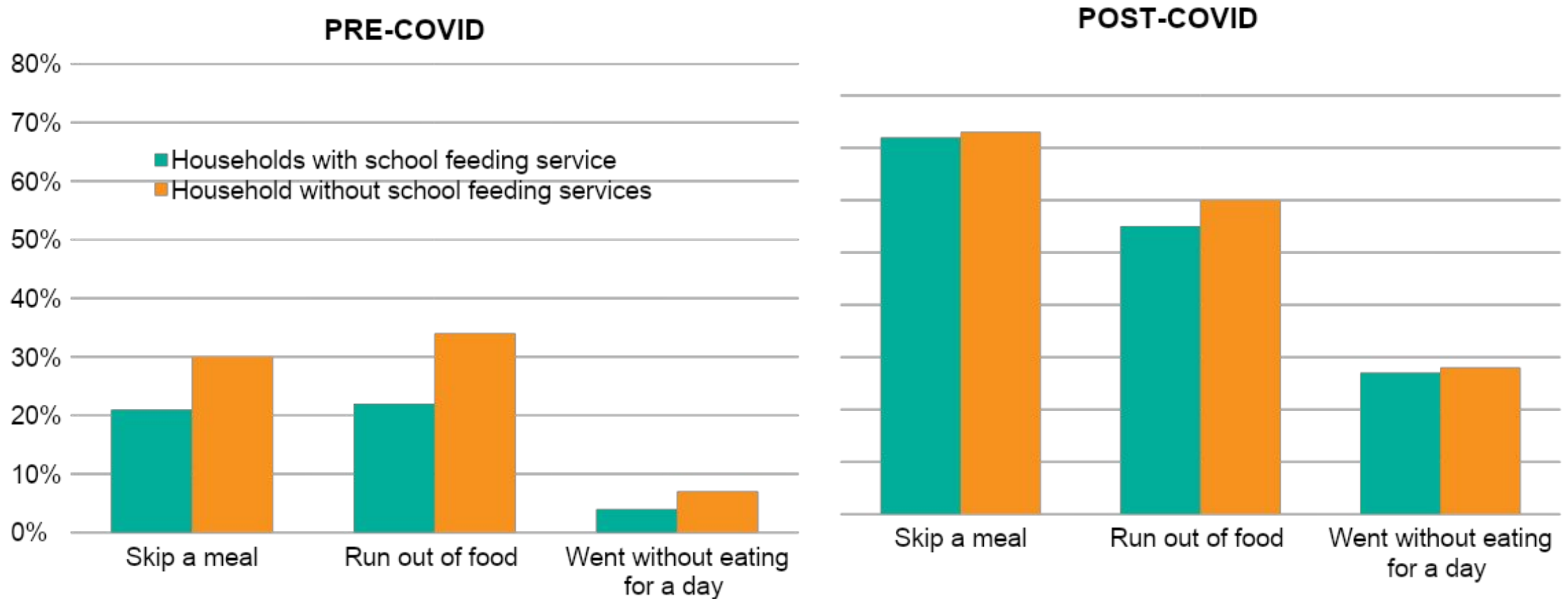
COVID-19 disrupted Public Services and Food Programs - 1

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



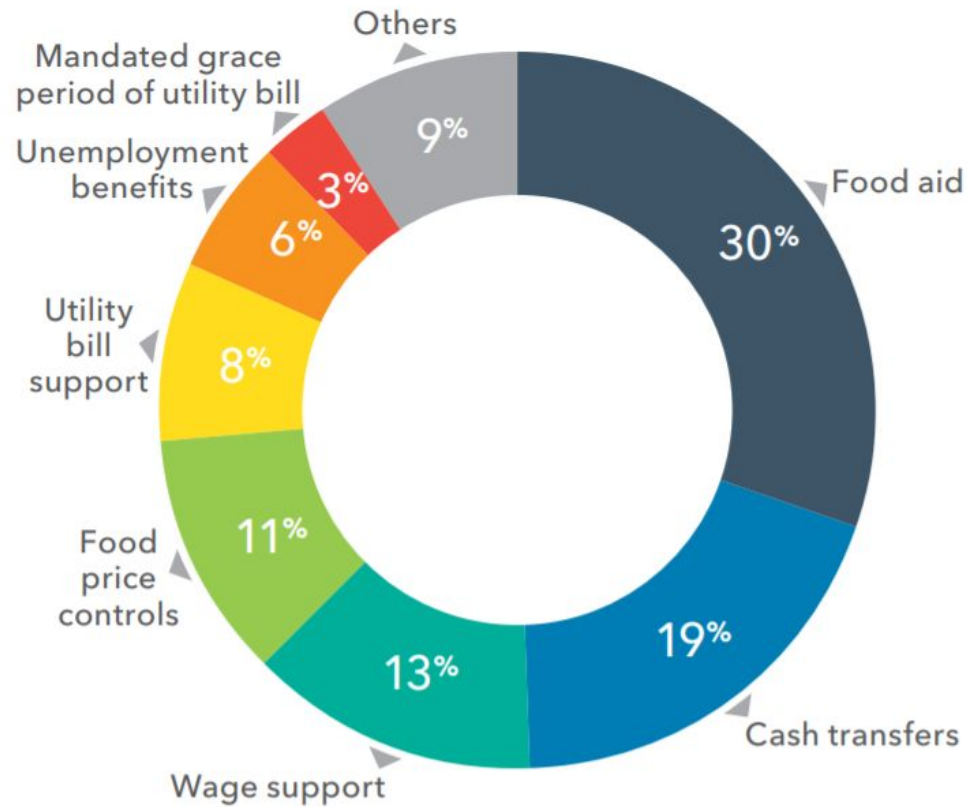
COVID-19 disrupted Public Services and Food Programs - 2

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



Scaling and sustaining social protection under COVID-19

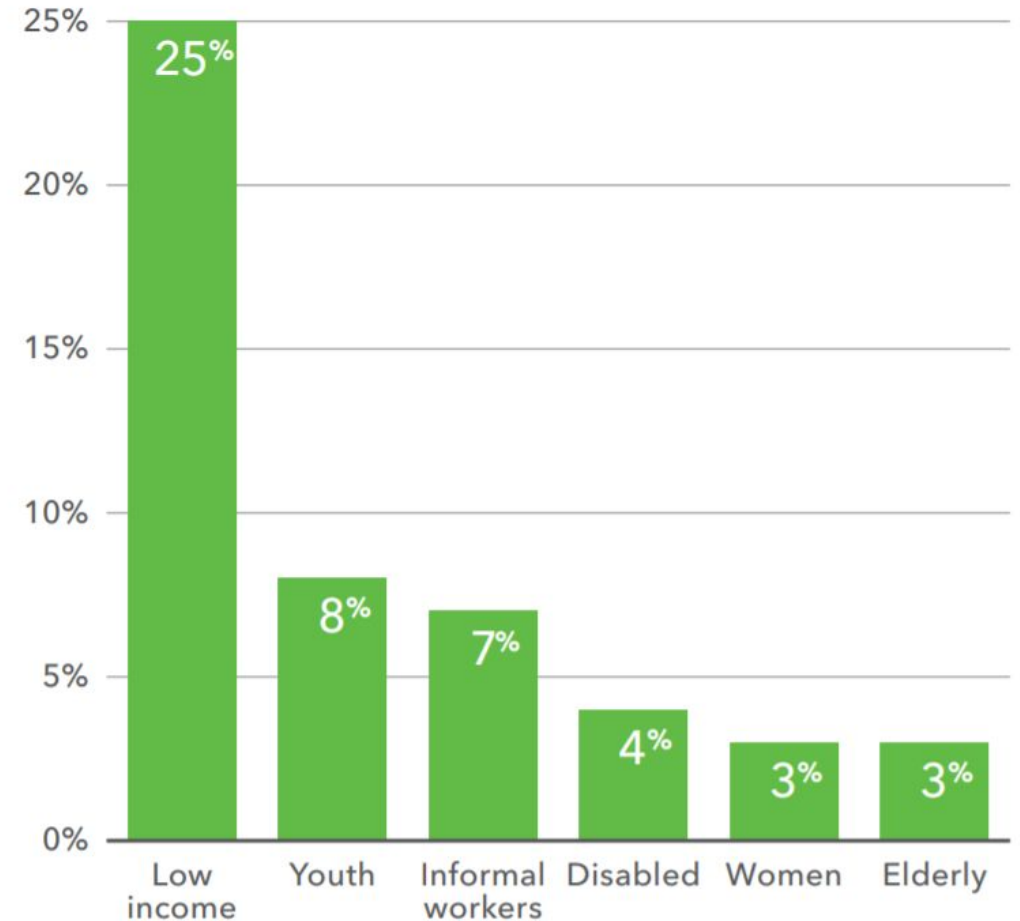
Distribution of policy types within social protection



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.

Share of social protection policies targeted to specific populations



Source: Calculated from IFPRI (2020).

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**



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*



Source: Reuters, 2020.

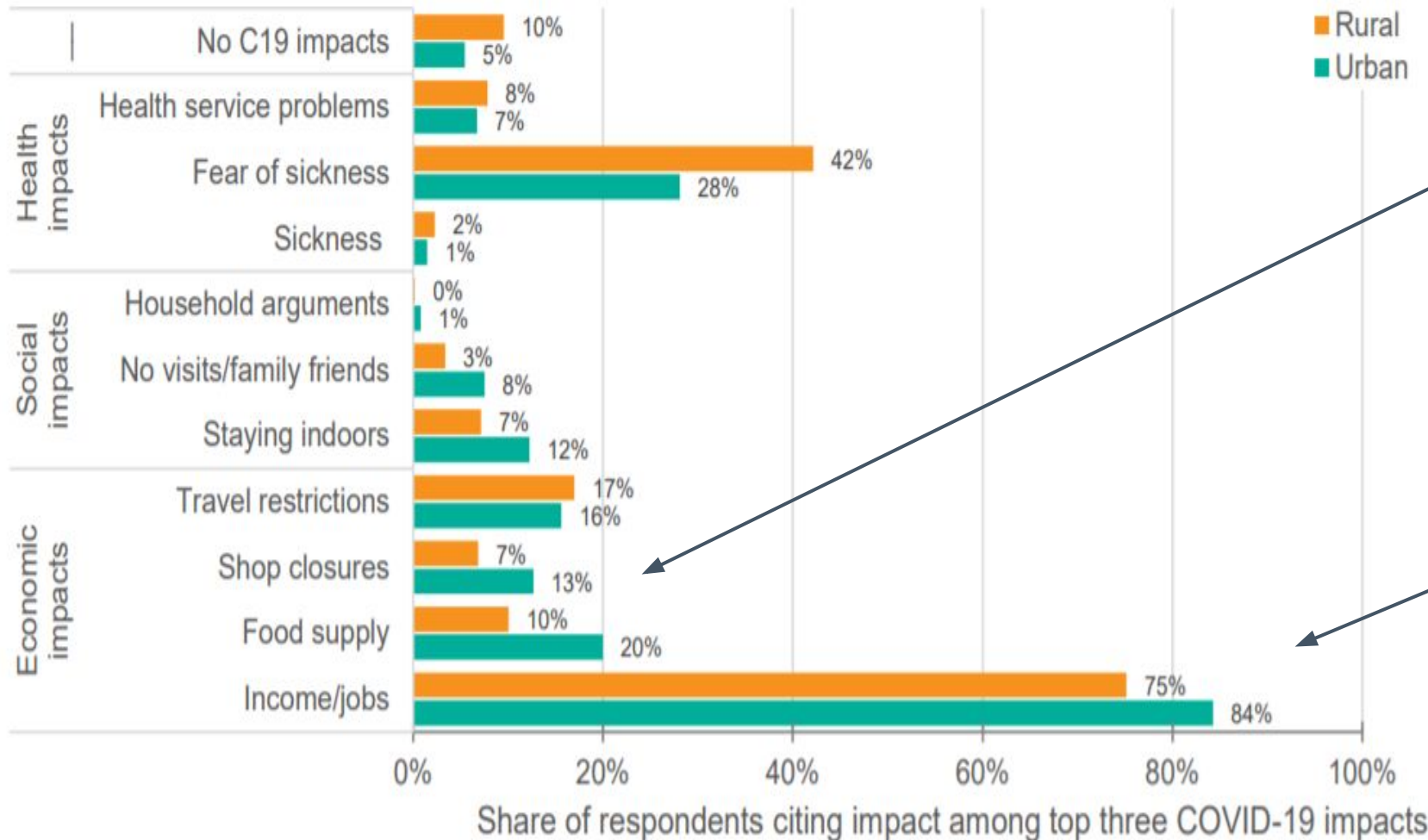


Source: Reardon and Swinnen, 2020.

Supply disruptions versus income and employment

Survey evidence from Myanmar

Figure 4. Respondent assessments of three largest impacts of COVID-19 on their household



■ 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

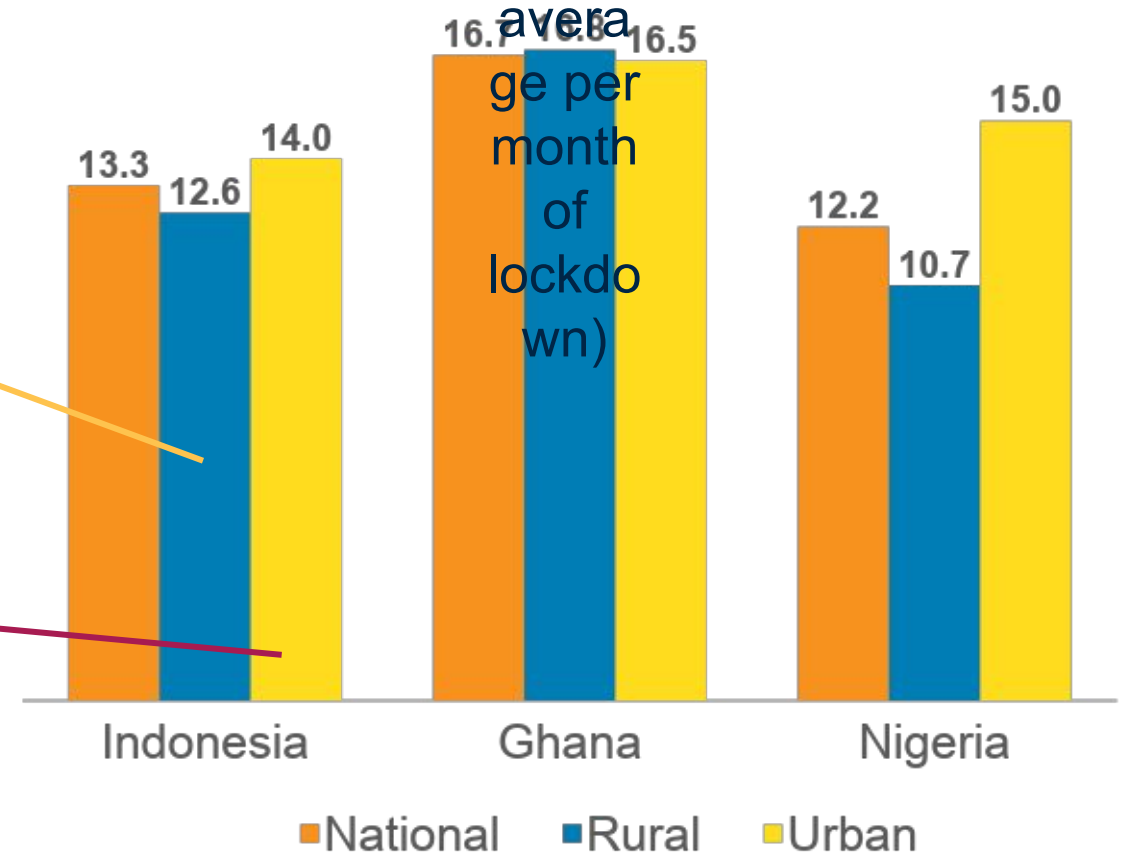
Total
AgriFood
Farmin
g Proces
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Service
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-18%

-14%

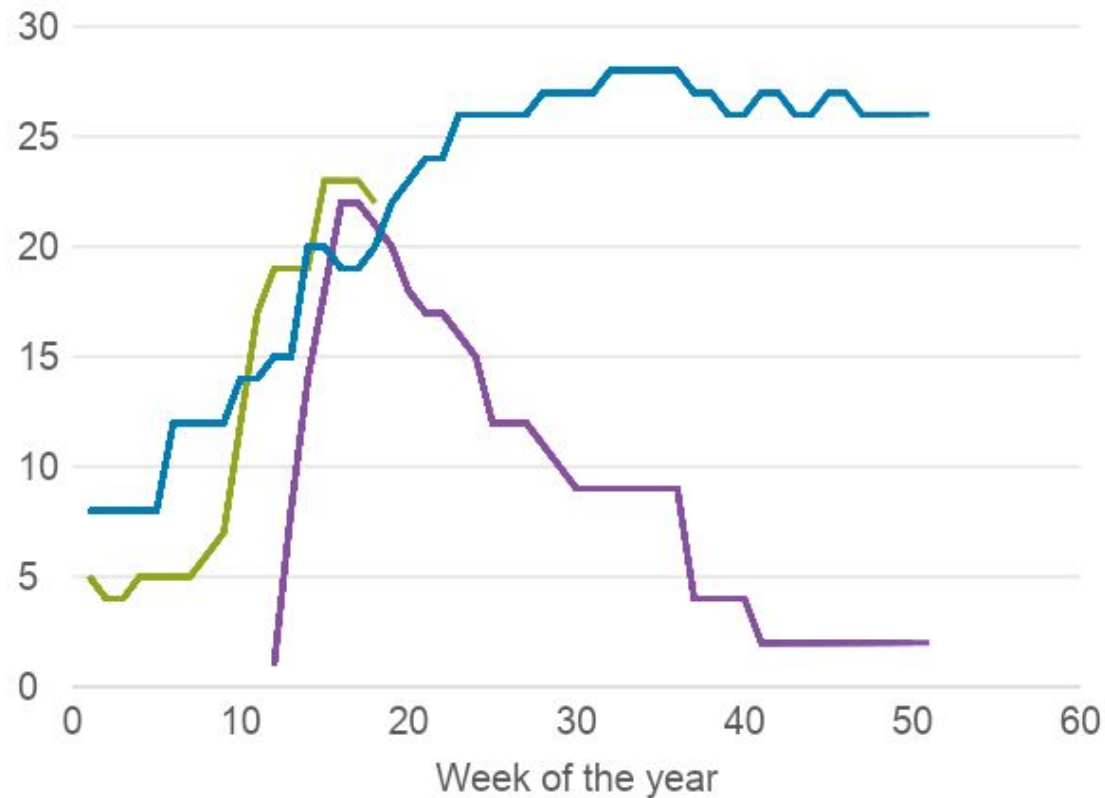
-29%

-92%



Shocks and Trade Restrictions

Number of countries implementing food export restrictions



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

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

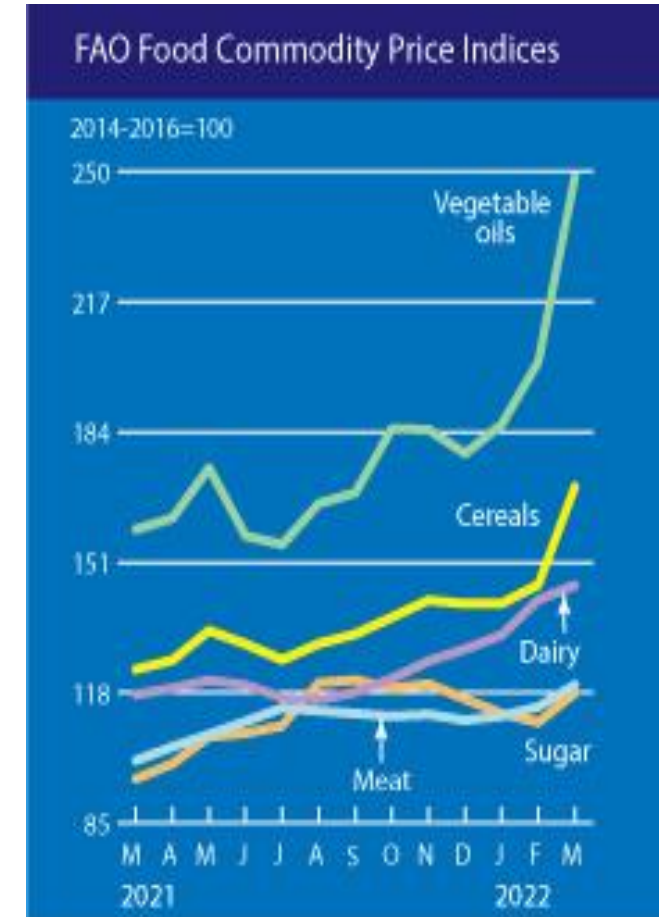
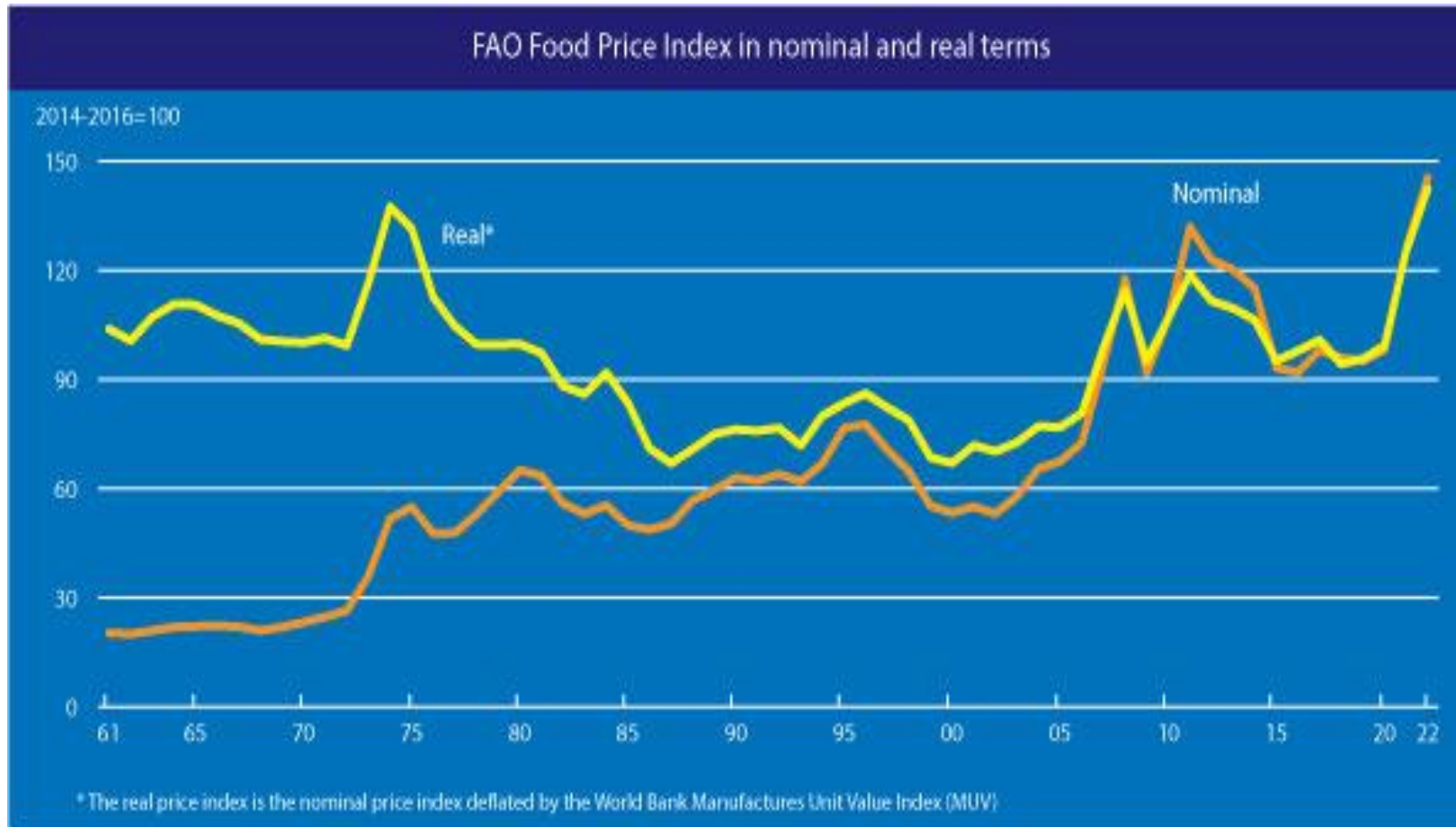
Daily update. Includes food, feed and other uses of food products.



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

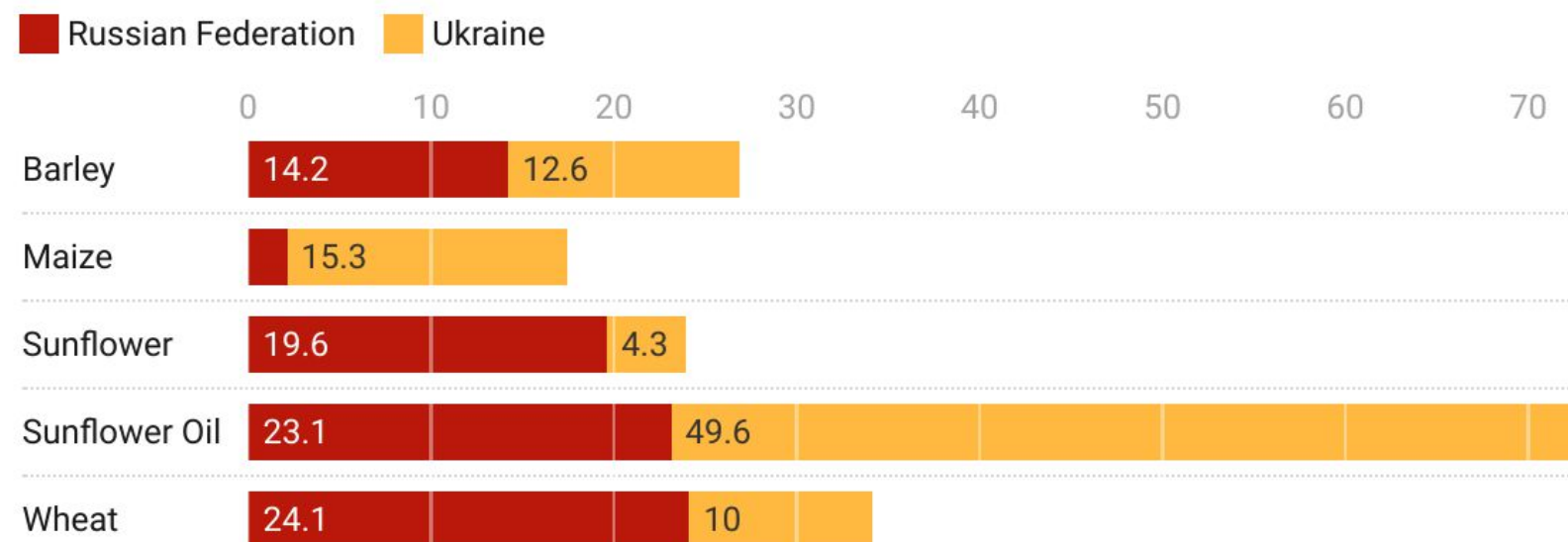
Chart: David Laborde • Source: IFPRI

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

Share in global markets, volume



Russia
5.8%
Global Market
Share in Calories

Ukraine
6%
Global Market
Share in Calories



Intra-EU trade excluded from computations.

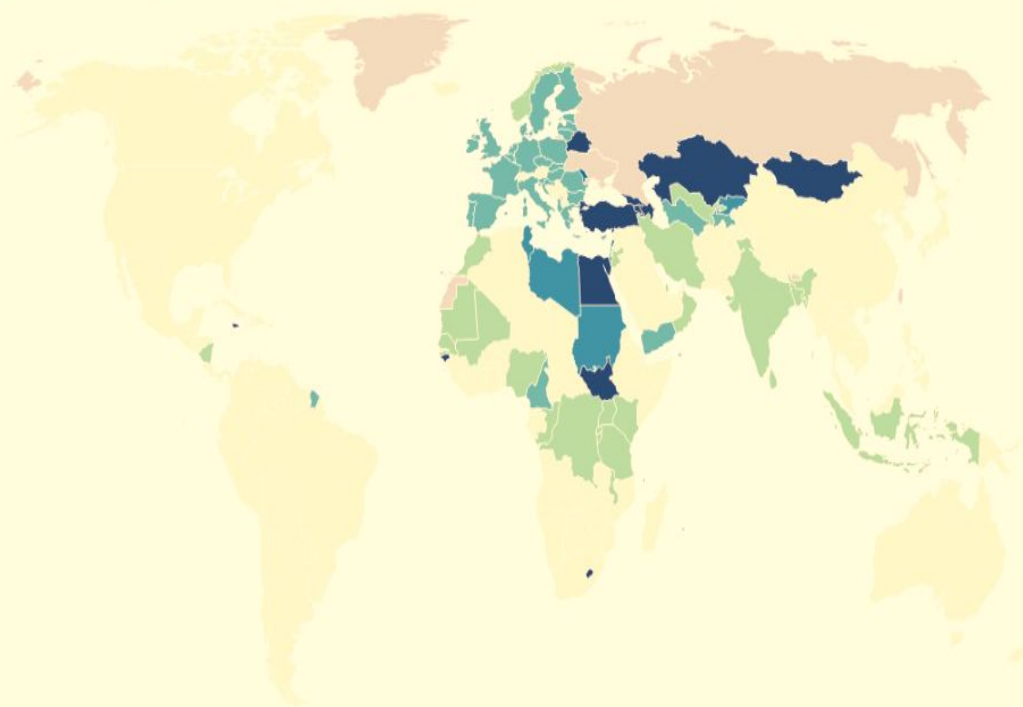
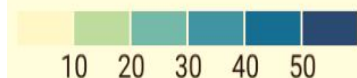
Chart: David Laborde • Source: COMTRADE



<https://www.ifpri.org/blog/how-will-russias-invasion-ukraine-affect-global-food-security>

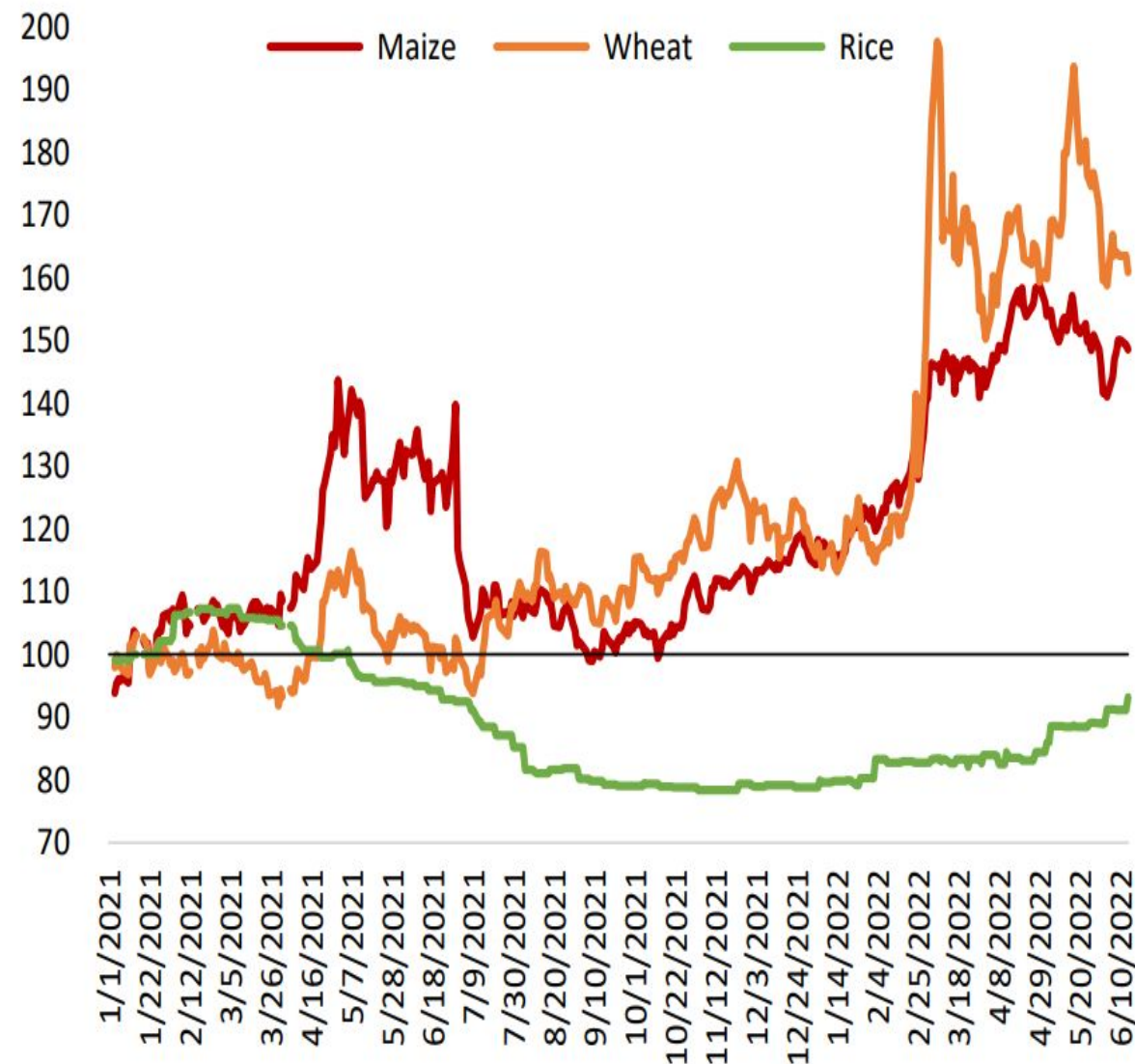
Ukraine-Russia war immediate food impact

Share of the Russian Federation & Ukraine in imported calories



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

Cereal Price Indexes (January 2020=100)



Example : Egypt

Egypt's wheat imports, Million metric tons

Breakdown by exporter

Other Exporters Russian Federation Ukraine

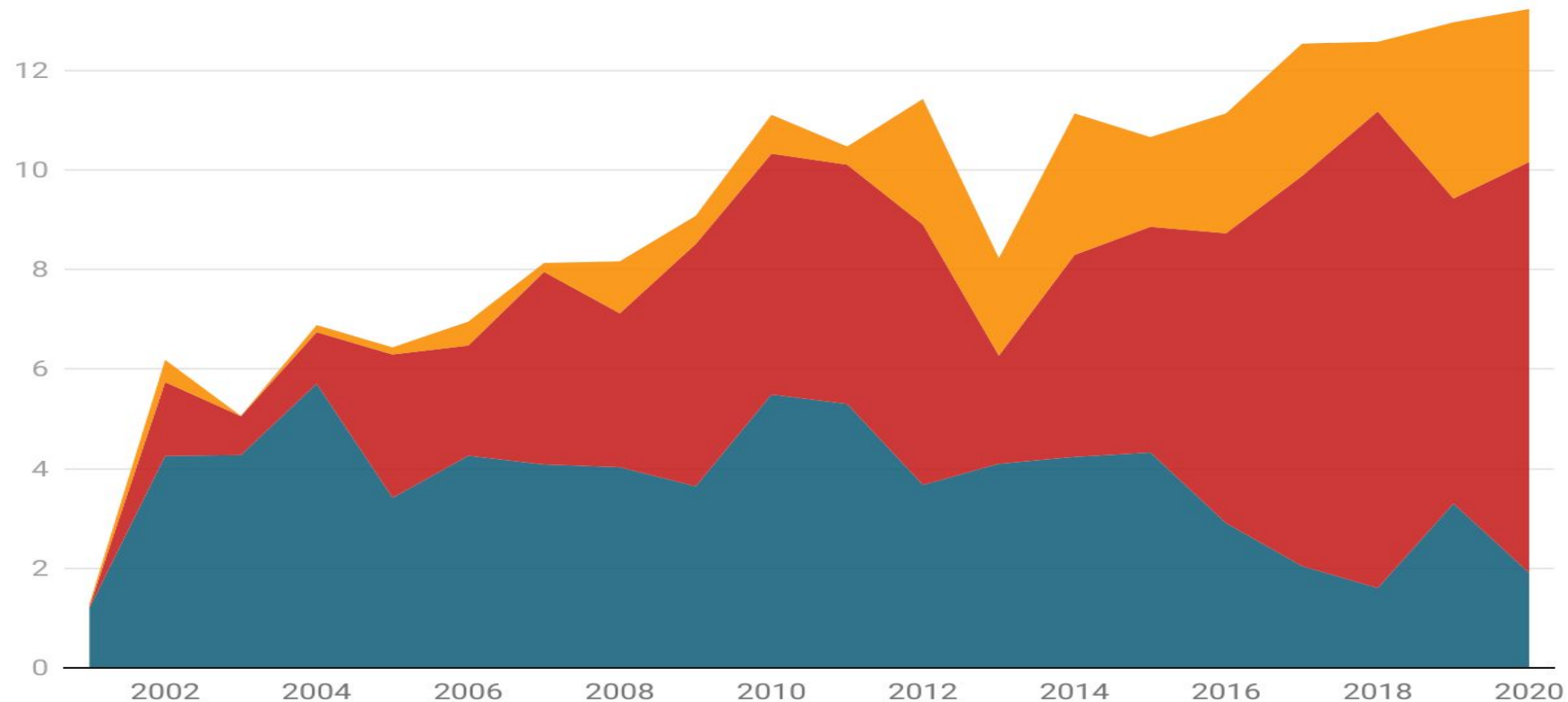
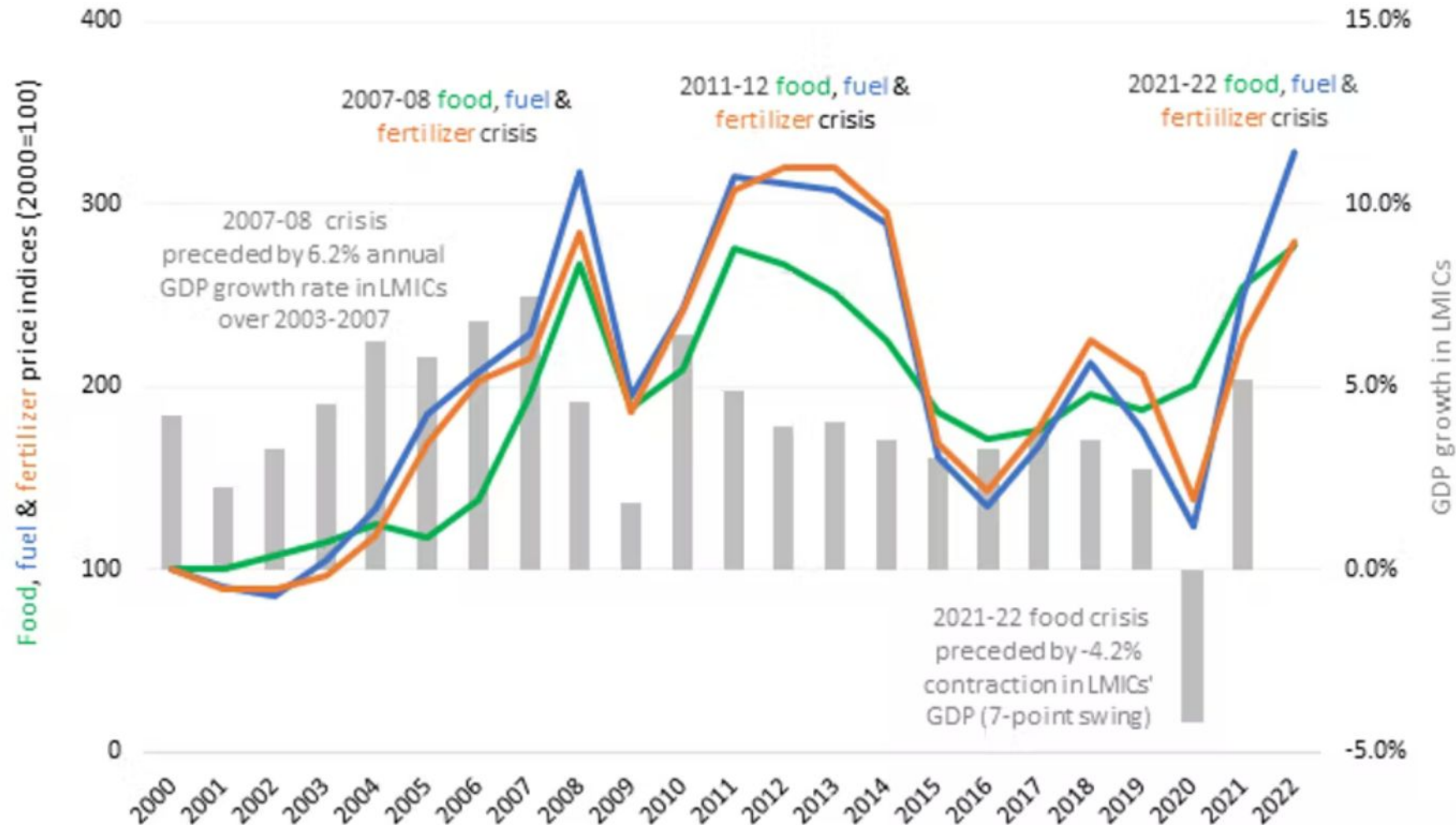


Chart: David Laborde • Source: COMTRADE • Created with Datawrapper

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



Shocks and Volatility :

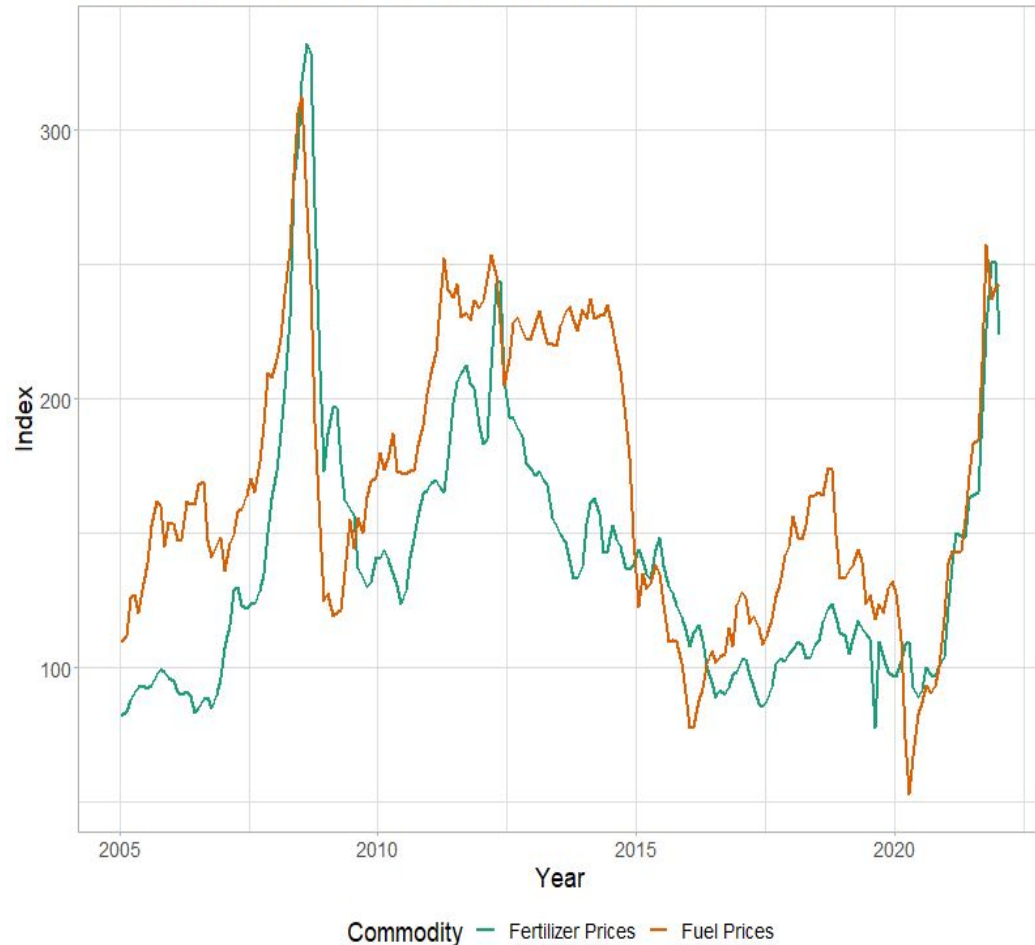
How to enhance resilience and inclusion ?

- Measures to **limit** the frequency and magnitude of shocks.
- Measures to be **informed and anticipate** the shock
- Measures to **absorb** the shock

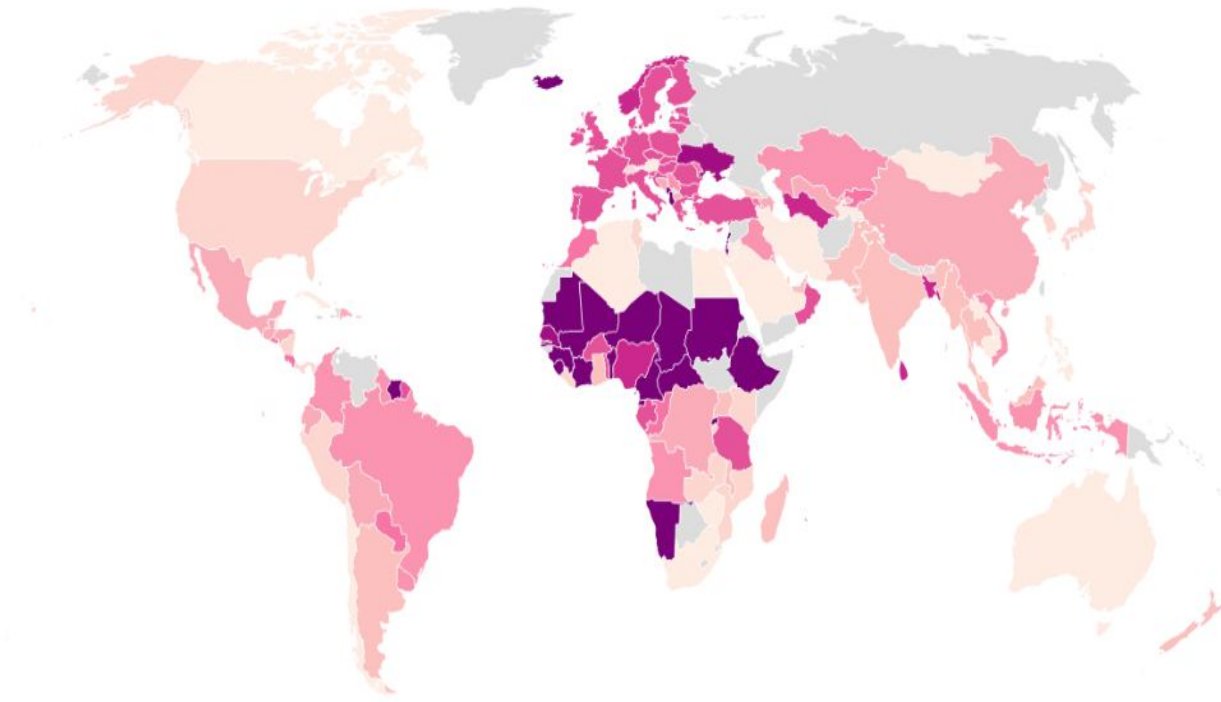
Resilience and **inclusion** are intrinsically linked

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



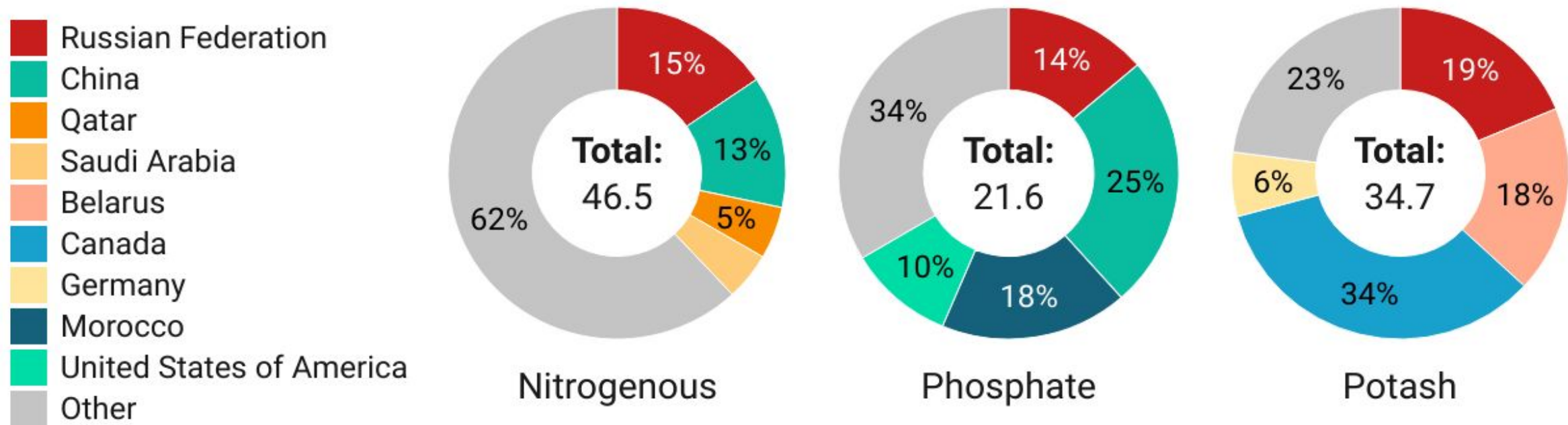
Based on IMF data

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

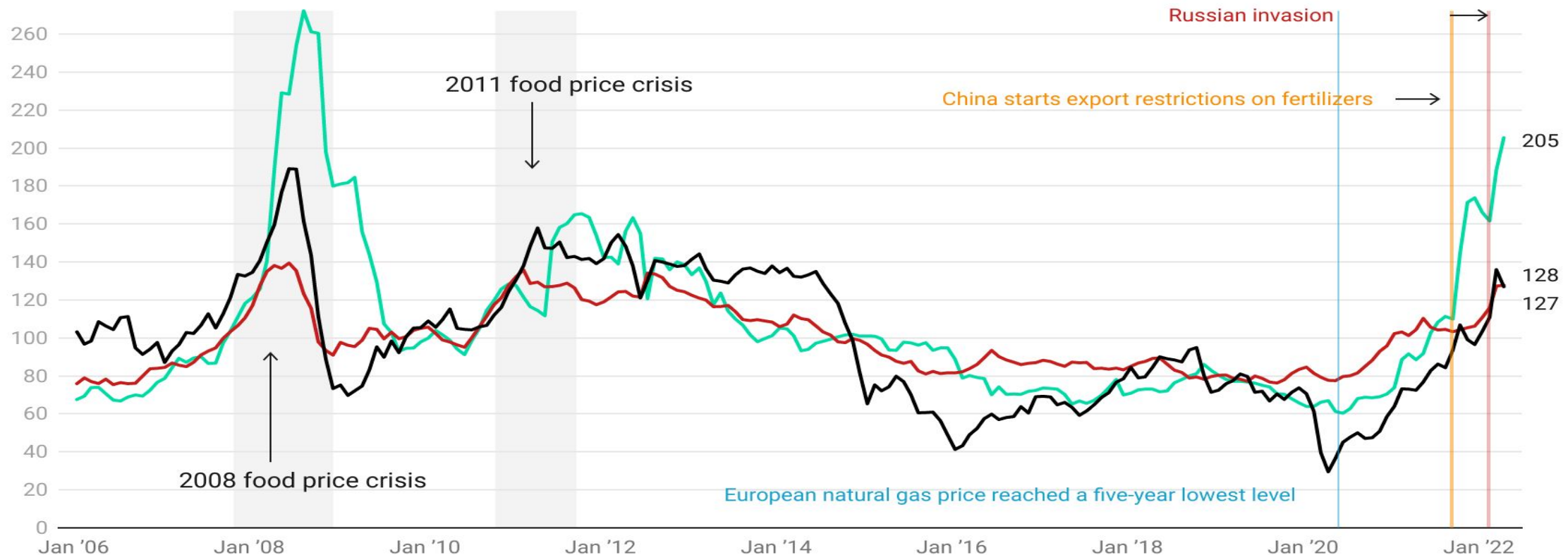
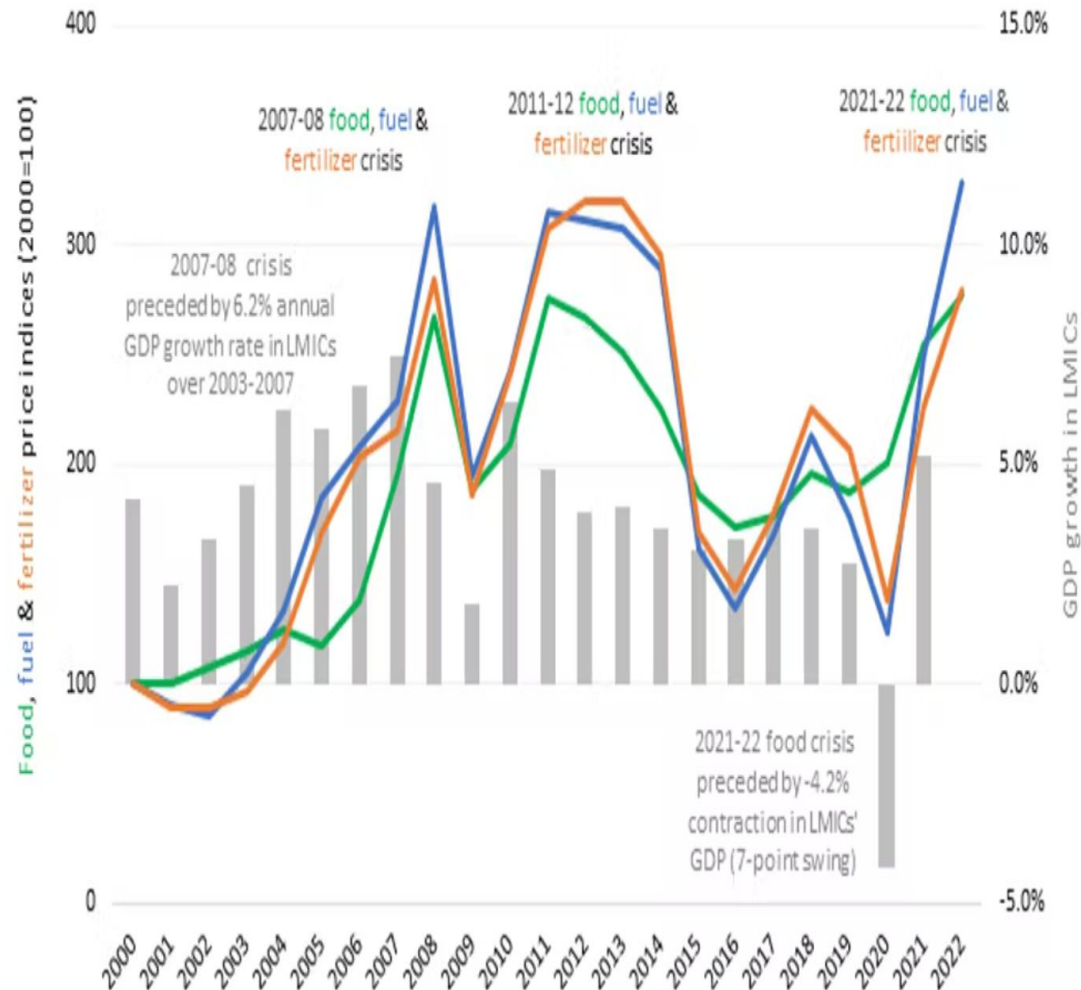
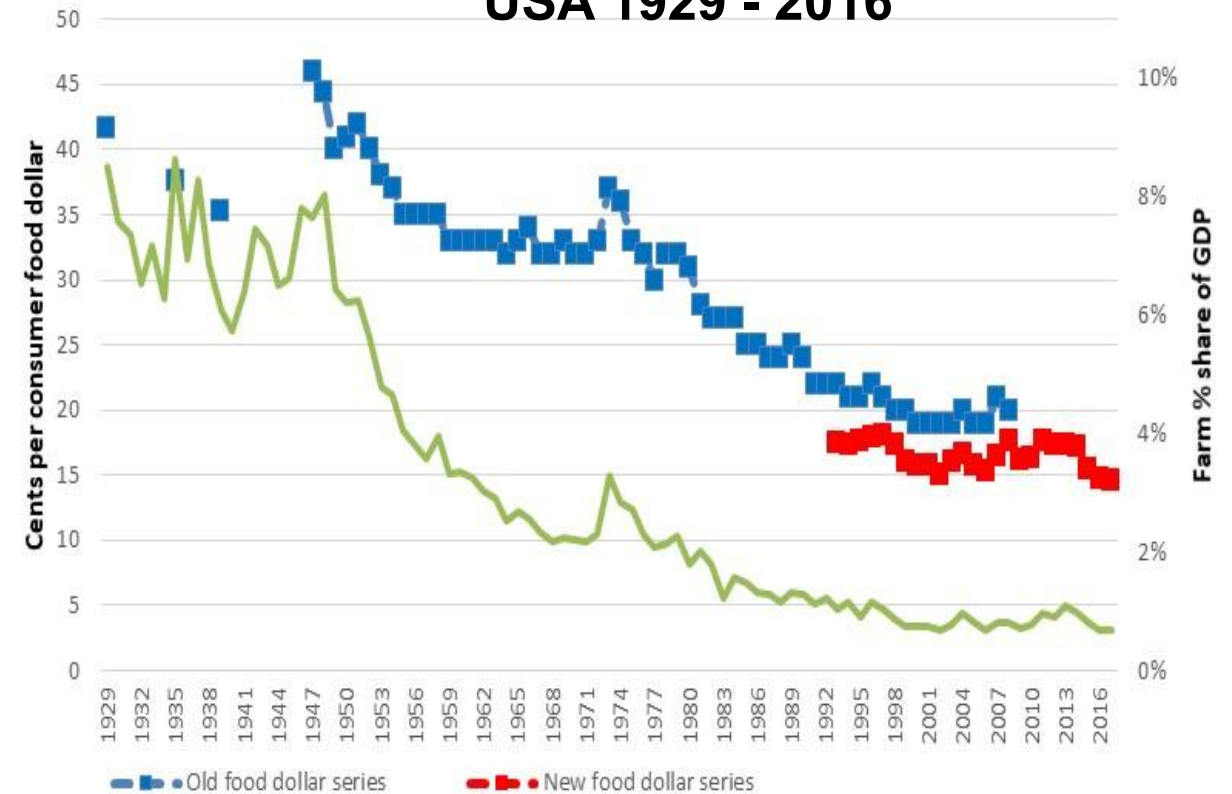


Chart: Based on David Laborde • Source: World Bank, U.S.Bureau of Labor Statistics

What is more important for food security ? Food, oil or fertilizer prices ?



Share of agriculture in food prices USA 1929 - 2016



Data sources: BEA, USDA ERS

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

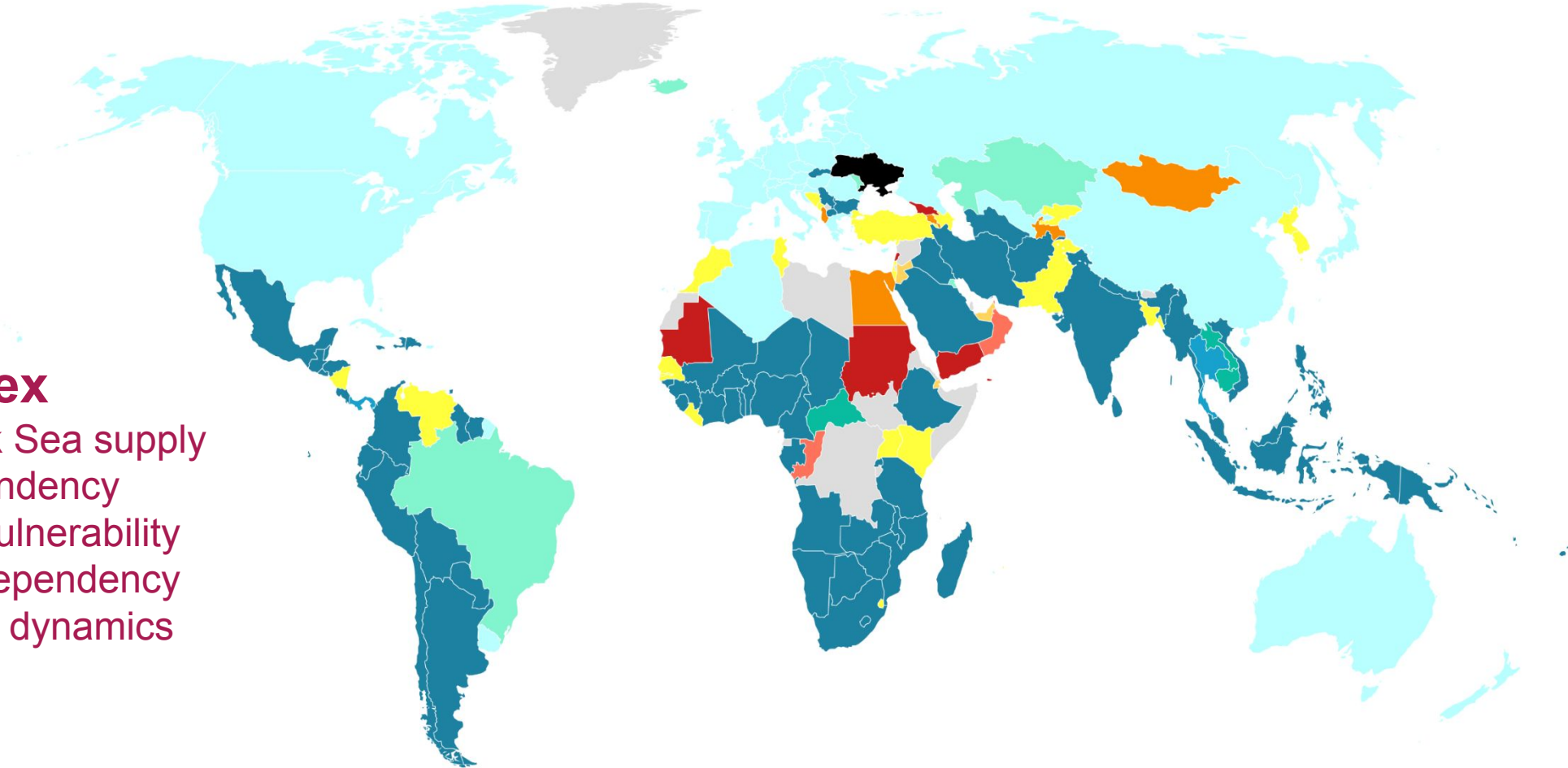
Source: Barrett, Reardon, Swinnen, Zilberman, JEL, 2022

2022 Country Vulnerability

1 - Extremely High - Food consumption directly exposed to conflict and low stocks 2 - Extremely High - Food consumption directly exposed to export restrictions and low stocks 3 - Very High - Food consumption directly exposed to conflict 4 - Very High - Food consumption directly exposed to export restrictions 5 - High - Food consumption exposed to export restrictions or conflicts 6 - High - Large Increase in Food Cost compared to GDP expected 7 - High - High Risk of Food Price increase due to last month changes 8 - Moderate - High Risk of Food Price increased driven by the last 12 month changes 9 - Moderate - No immediate risks but Fertilizer supply compromised Ukraine x - Minor Risk

Composite Index

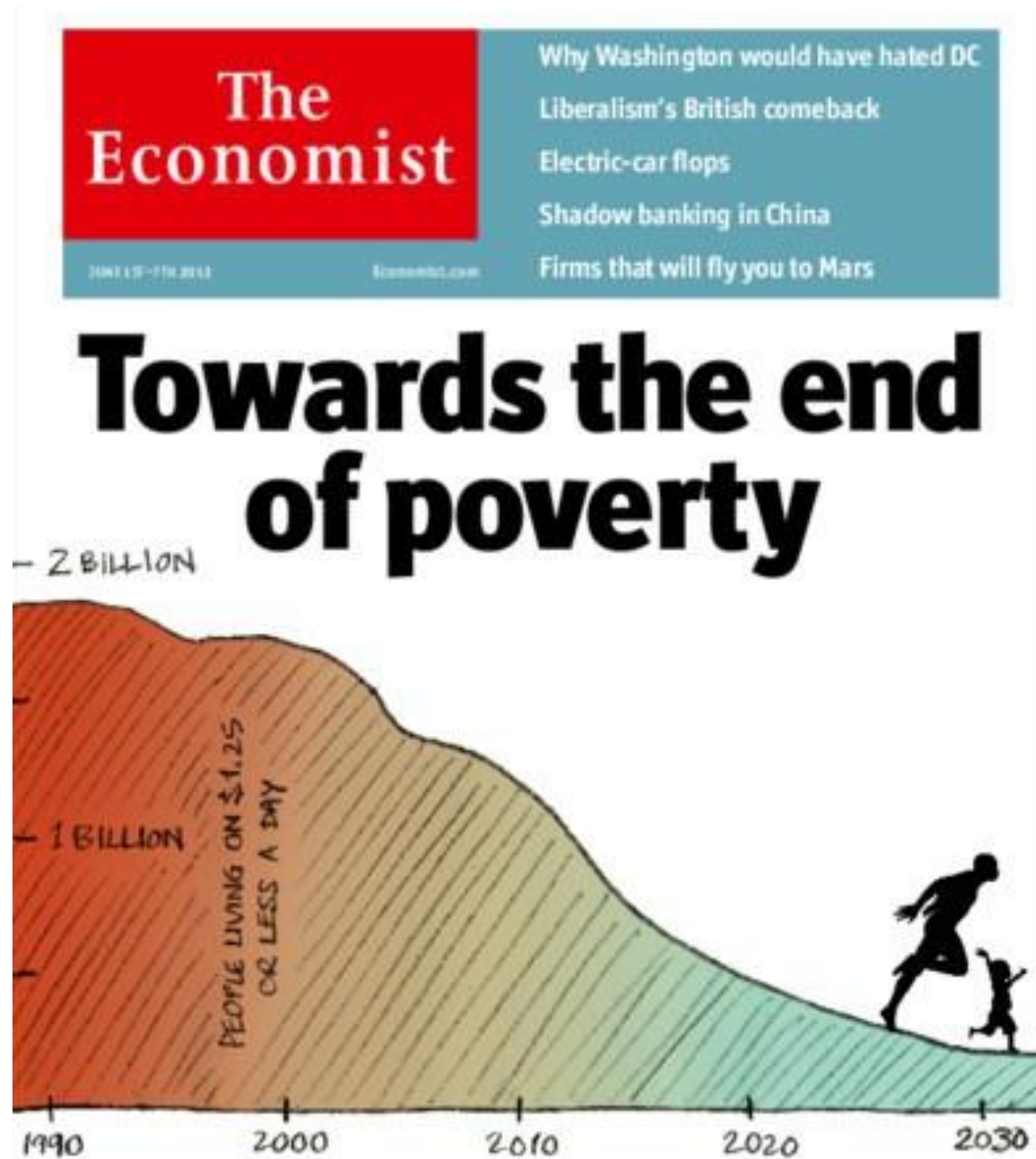
- Exposure to Black Sea supply
- Food import dependency
- Macroeconomic vulnerability
- Fertilizer import dependency
- Local food market dynamics



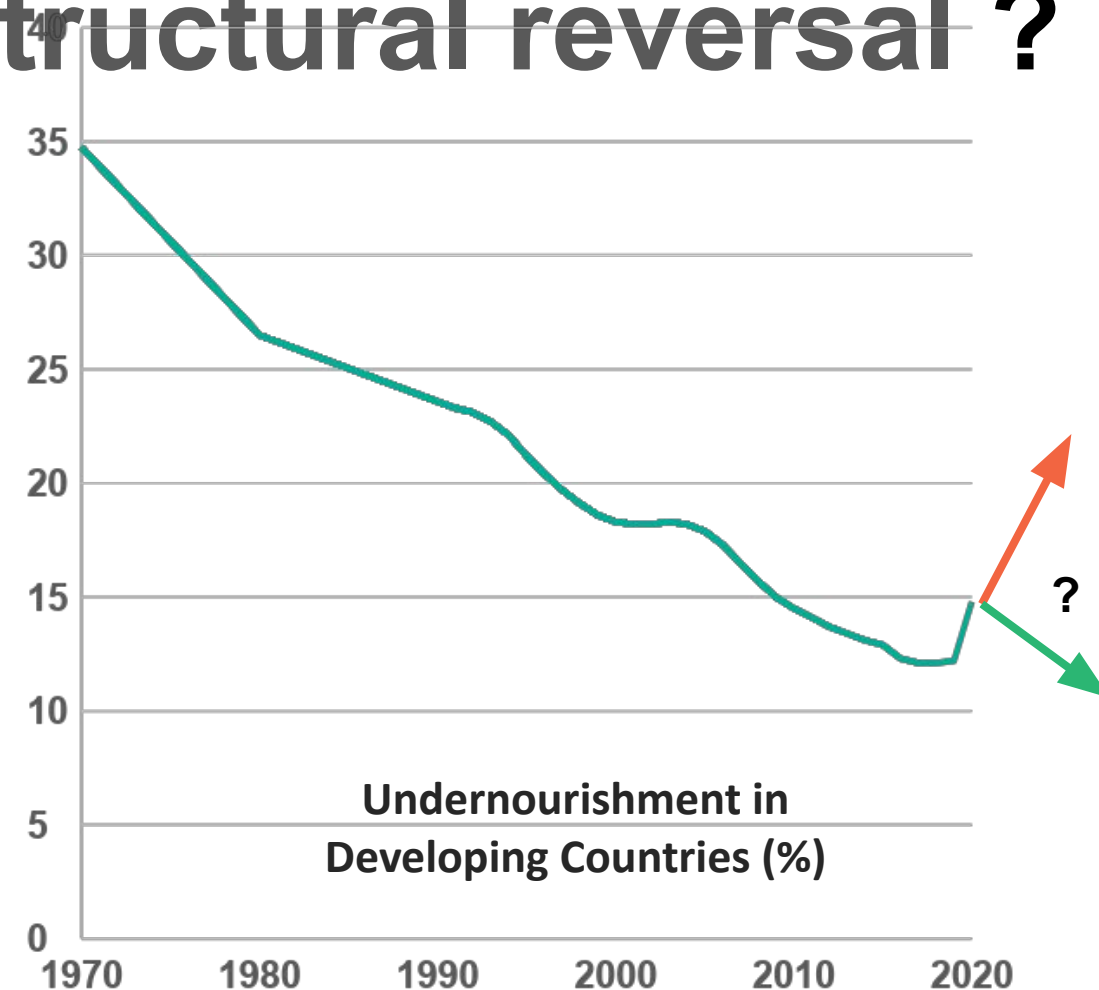
Assessment based on March 28th 2022 data

Map: David Laborde

From June 2013 ...



A temporary hiccup or structural reversal ?





Thank you for your attention.
For more information, see:
www.ifpri.org

- **Special Blog Series**
- **Special Indicator Series**
 - Food and Fertilizer Export Restrictions Tracker
 - Excessive Food Price Volatility Early Warning System
 - Staple Food Stock-Use Monitoring System
 - Vulnerability Dashboard
 - Fertilizer Market Dashboard

