

EXECUTIVE INSIGHTS

Food Security Strategies: How To Adapt to a Changing World

The tragic daily news of death and destruction in Ukraine has recently been accompanied by reminders of how global food supplies are becoming more scarce and more costly. From expectations of lower production and exports in the war-torn region to export bans imposed on commodities such as oil and wheat in other countries, recent events have served to highlight an increasingly important issue on the global stage: food security.

But while the current conflict is exacerbating markets, it's hardly the only factor having an impact on food security issues. Indeed, given rising populations, the impact of climate change on food production and other longer-term supply chain issues, food security risks are rising and remain a concern for many nations.

In this L.E.K. Consulting *Executive Insights*, we examine how the global nature of our food supply means that a shock in one part of the world can have an outsized impact on a region multiple time zones away. As such, it is increasingly important that countries have a robust food security strategy in place and that they are able to execute on that strategy in order to be prepared for the inevitable future shocks to come.

Why food security matters

A portion of the food consumed in a country will always be imported, which is why any sort of shock to the producing country — be it India, Thailand and Brazil for sugar; China for seafood; or various countries in Europe for fruits and vegetables — will be acutely felt in end markets.

In 2020, Russia and Ukraine together accounted for 9.3% of all global agricultural exports — versus just 5.5% in 2016 — which included 29% of all wheat sales and 12% of the total calories traded worldwide.

The invasion of Ukraine by Russia adds to a long list of events that have impacted wheat production and trade over the past three decades. Specifically, 35 notable events have affected more than 10% of expected country production since 1990, including six in Russia and nine in Central and Eastern Europe.

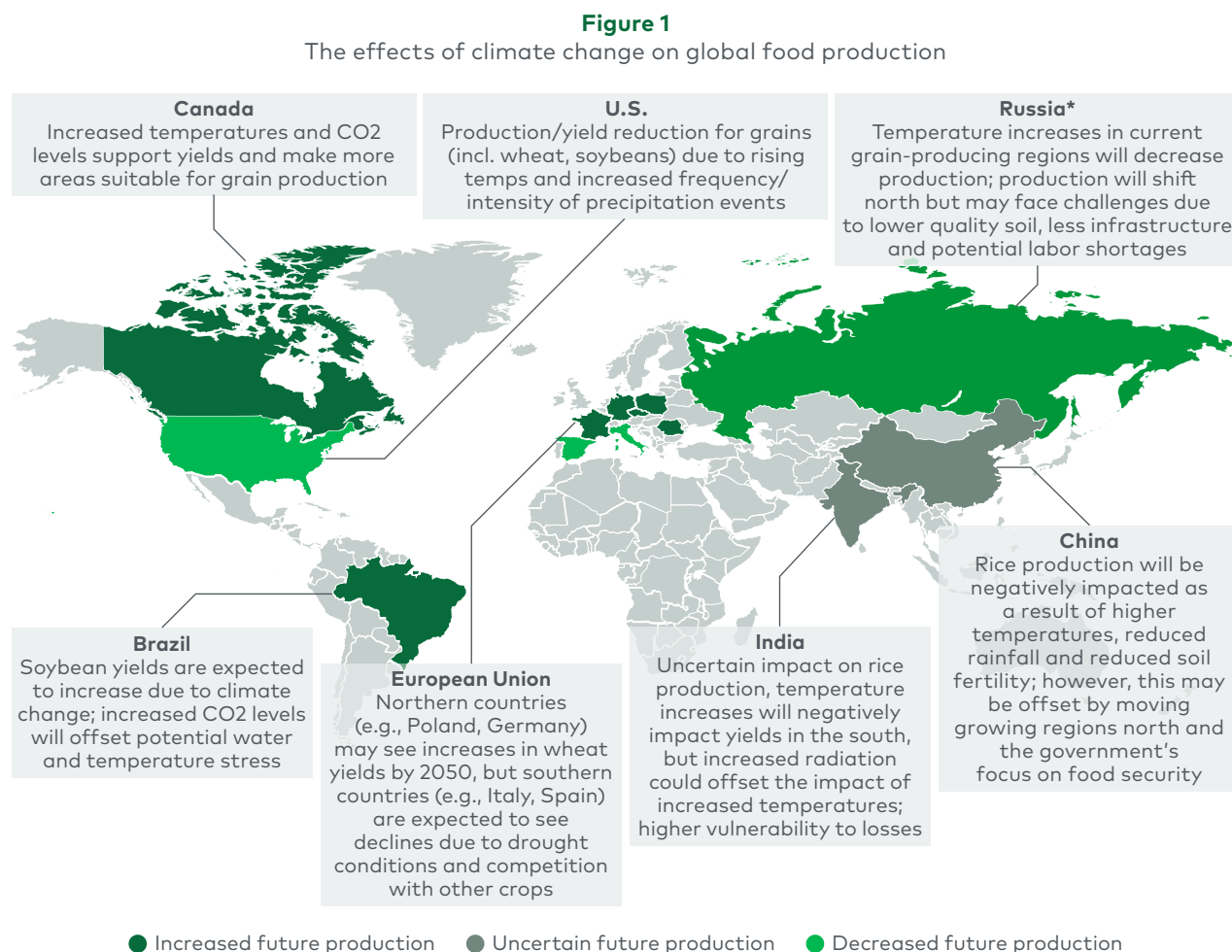
Today, China, along with countries in the Middle East and North Africa — particularly Egypt — are the biggest importers of Russian and Ukrainian wheat. But the recent shock to the wheat markets trade has implications on a global level. The implications include higher prices that could potentially price out the most impoverished consumers in the world's poorest countries, shipping delays and more. Wheat shortages could also drive consumers to substitute products, in turn increasing the price of other cereals and food items.

Factors impacting food security now and in the future

Beyond individual food items such as wheat, all aspects of global food production are expected to be significantly altered over the next few decades, including producing regions, production methods and trade routes. This altered landscape will emerge as a result of many factors, including:

- **Climate change** — shifting temperatures, precipitation, etc.
- **Agricultural technology developments** — biotech, controlled-environment agriculture, etc.
- **Global trade shocks** — trade tariffs, disease lockdowns, geopolitical issues, etc.
- **Input cost inflation** — natural gas price impact on fertilizers/crop chemicals, etc.

Climate change will arguably have the most widely felt impact on longer-term food security. According to Fitch Solutions, as temperatures continue to rise at an unprecedented pace, not only will growing regions be forced to shift away from the equator, but intense climatic events will also increase production gains in certain regions while increasing the risk of production losses in others. Indeed, regional production shocks, such as flooding in the vegetable-producing regions of Shandong in China, have already contributed to price volatility and an increase in global food insecurity, with the most severe ripple effects taking place in underdeveloped parts of the world (see Figure 1).



*Other projections from OECD-FAO and IFPRI see increases in Russian wheat production through 2030

Note: OECD-FAO=Organisation for Economic Co-operation Development (OECD) and the Food and Agriculture Organization (FAO) of the United Nations; IFPRI=International Food Policy Research Institute

Source: Fitch Solutions; L.E.K. research and analysis

In the meantime, factors including spikes in the cost of fertilizer and shipping delays are putting downward pressure on food trade and contributing to higher food prices around the globe. Price volatility of key food items — poultry, beef, seafood and wheat — has been increasing for the past 10 years, with volatility in poultry prices nearly tripling since 2010 due to the outbreak of disease.

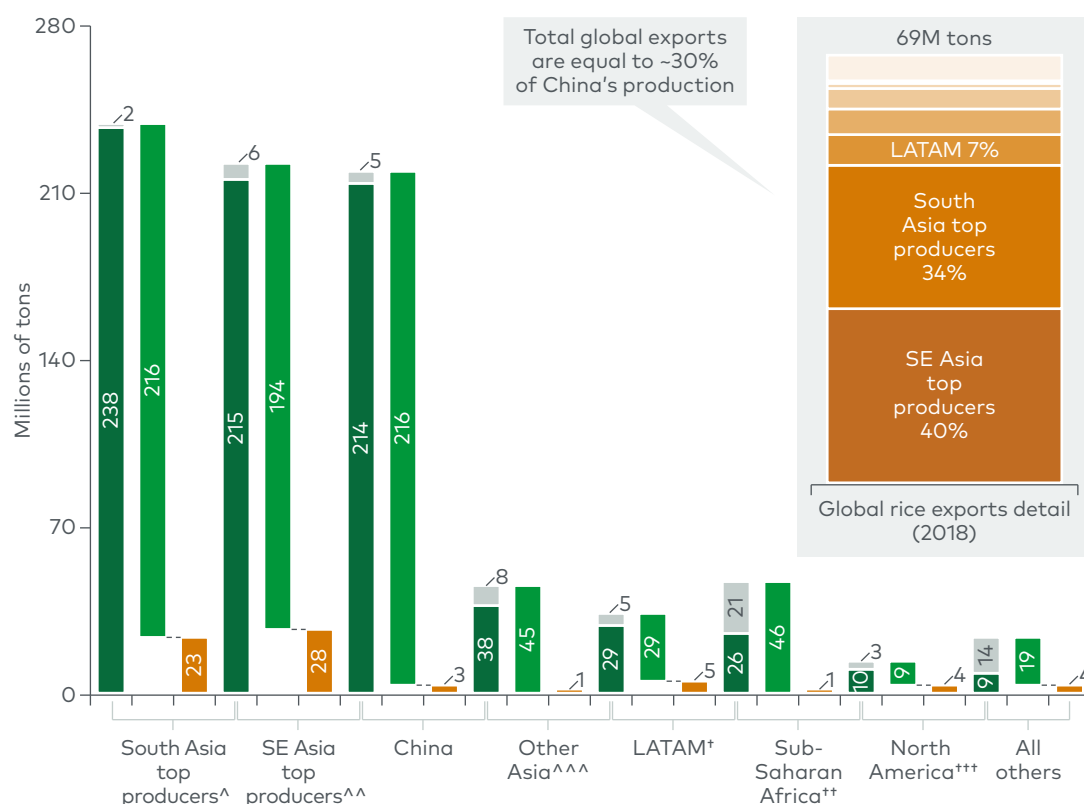
Other factors impacting food security include supply and logistics issues, among them the continued impact of COVID-19 and bunker fuel regulations implemented by the International Marine Organization, as well as the use of crops for biofuels (e.g., sustainable aviation fuel and renewable green diesel).

Importantly, export markets are also surplus markets, as producing regions first supply internal demand, then export any surpluses. In practice, this means that any impact to

production can have an outsized effect on export markets. Take rice and the role of China. Major shocks to rice production are relatively uncommon. But while China is not a big exporter of rice, it is the grain's biggest producer and biggest consumer. A shock that sends Chinese production of rice down by 10% would have three times the impact on the global export supply (see Figure 2).

Figure 2

Rice production, consumption and exports for selected regions and countries (2018)



Supply shock impact*	(34%)	(31%)	(31%)	(6%)	(4%)	(4%)	(2%)	(1%)
Number of >10% production loss**	1	0	0	0	0	0	7	
Average of >10% production loss**	(16%)						(16%)	
Max YoY production drop; year	(16%); 2002	(6%); 2019	(8%); 2003	(8%); 1993	(9%); 1996	(8%); 1994	(24%); 2011	
Export CAGR, 2014-18	1%	0%	52%	22%	1%	7%	(1%)	0%

● Production ● Imports ● Consumption ● Exports

*Shows the impact of a 10% decline in local production on global export volume, keeping all other factors constant

**1990-2019

[^]India (173M), Bangladesh (54M) and Pakistan (11M)

^{^^}Indonesia (83M), Vietnam (44M), Thailand (31M), Myanmar (28M), Philippines (19M) and Cambodia (11M)

^{^^^}Japan (10M), South Korea (5M)

[†]Peru (4M), Colombia (3M)

^{††}Nigeria (8M), Madagascar (5M)

^{†††}USA (10M)

Source: Chatham House; FAO; L.E.K. research and analysis

In a related *Executive Insights*, we'll discuss how we see those uncertainties potentially unfolding and how markets, governments and companies can preempt risks to their food systems.

Conclusion

Food security is a global issue, whereby a war or climate event or any other number of developments — be they expected or not — will impact what is available on grocery shelves halfway around the world. It is critical, therefore, that food-focused companies, investors and members of government understand the key dimensions of food security — both how they've impacted food security so far as well as the full range of ways those dimensions might play out in the future.

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