



Rising energy prices & the impact on food production



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Rising energy costs have been a major factor in driving up food prices during 2022. What are the links between food and energy prices and how are businesses and policymakers responding to the crisis?

What is happening to food and energy prices?

Global inflation was moderating when the pandemic began, and the downward trend continued into the early months of the crisis. Surging prices since late 2020 have pushed inflation steadily higher.

The Economist Intelligence Unit's latest Worldwide Cost of Living (WCOL) survey shows that prices have risen by an average of 8.1% in local-currency terms over the past year in the world's biggest cities. This is the fastest rate for at least 20 years, reflecting a global cost-of-living crisis sparked by the war in Ukraine and continuing covid-19 restrictions in China. Prices for gas and electricity have risen by 29% on average in local-currency terms in western European cities as the region tries to wean itself off Russian energy. This compares with a global average increase of 11%.

Inflation for food and household goods has also been high amid trade restrictions. In contrast, prices for recreational goods and services have been subdued in local-currency terms; this may reflect softer demand as consumers focus on spending on essentials such as food. There are, however, a wide range of factors driving increased energy costs – these include:

- The Russia-Ukraine war including the damage to infrastructure from the conflict, as well as trade sanctions against Russia;
- A rebound in the global economy following the end of the Covid-19 pandemic;
- Climate and sustainability and the need to transition away from fossil fuels;
- Failure to invest in alternatives – including nuclear, and storage of LPG.

Russia's invasion of Ukraine followed last year's steep rise in commodity prices, pushing food prices to a record and natural gas to historic highs. Natural gas prices have risen strongly across all key gas-consuming regions since early 2021, with European and Asian benchmark prices hitting all-time records in the first quarter of 2022. Prices have eased since their peak, however, as of January 2023 natural gas prices in Europe remain 177% up on January 2021.

In January 2023, global wheat prices, a staple in which Russia and Ukraine together account for a quarter of global exports, were up 1.6% on January 2022, but 32% up on January 2021. Food and energy imports from these sources continue to be disrupted and countries face high import costs and increased uncertainty about supplies.

The link between fertiliser and energy prices

Nitrogen is an essential nutrient for virtually all plant life. Ammonia is the starting point for all mineral nitrogen fertilisers, and half of the ammonia is converted to urea, the most common nitrogen fertiliser product used globally. Across the world, ammonia is made almost exclusively from natural gas, consuming around 170 billion cubic metres (4% of global gas consumption). The exception is China, where ammonia production is based mainly based on coal.

Fertiliser prices have more than tripled since mid-2020 to reach their highest level since the 2008-09 food price crisis and their highest level on record in the case of urea. This surge in fertiliser prices has been partly driven by the recovery in demand following the end of the Covid-19 pandemic, as well as the impact of trade restrictions on Russia and Belarus.

Various supply disruptions and trade restrictions, and soaring input costs have also contributed. The cost of producing fertilisers is closely linked to energy prices, particularly in the case of nitrogen fertilisers. Natural gas often accounts for 70% to 80% of the operating costs of producing ammonia and urea, resulting in a close correlation of prices.

In 2022 nitrogen fertiliser plants announced temporary closures blaming spiralling natural gas costs. This was followed by strong increases in input costs and trade restrictions due to the Russia-Ukraine war. However, prices eased towards the end of the year but remain high. According to the World Bank as of January 2023, global urea prices were 48% down on January 2022, but 68% up on January 2021.

Why are rising energy prices impacting food production?

There is a clear link between the cost of many farm inputs and energy prices such as the link between fertiliser and energy prices. On top of this many farm activities are energy intensive.



For example, field cultivations and heating greenhouses, buildings, and dairies use fuel that can be a substantial cost to the farm.

Direct energy use in agriculture includes electricity for automated water irrigation, fuel consumption for farm machinery and energy required at various stages of food processing, packaging, transportation, and distribution.

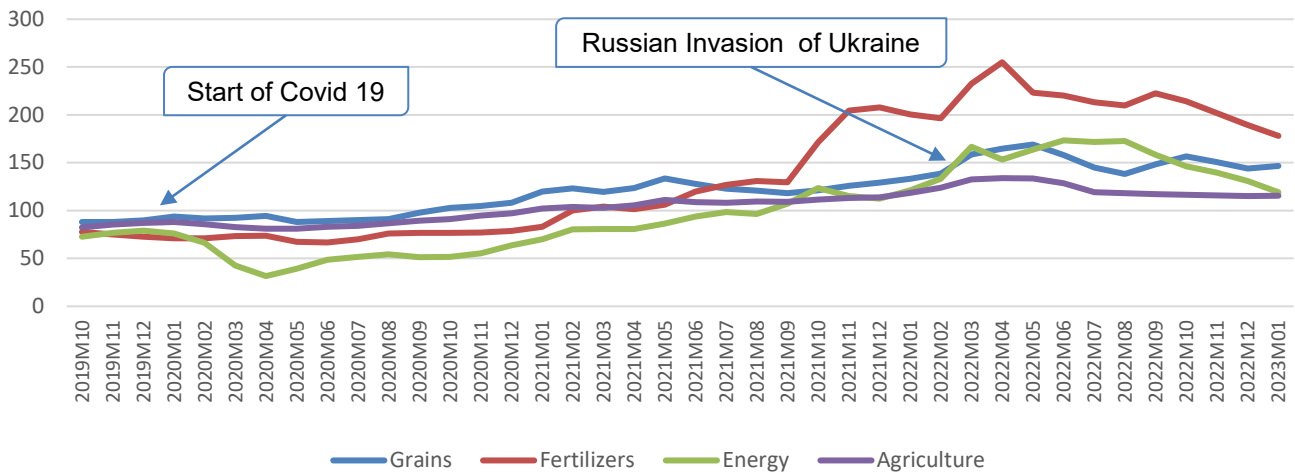
Pesticides and mineral fertilisers use a lot of energy to manufacture which results in large quantities of energy being used indirectly. While the share varies considerably between regions – depending on factors such as weather conditions and crop types – direct and non-direct energy costs can account for 40% to 50% of the total variable costs of cropping in advanced economies such as the United States.

year compared with 2021 were fertiliser up 122%, energy up 42% and feedstuffs up 29.5%. On the output side, milk prices rose 44.5%, cereals by 40.6% and cattle by 17.2%. However when comparing December 2022 with the previous month, input costs fell by 1%, while output prices rose by 6.3%. Energy and fertiliser costs decreased by 9.2% and 0.8% respectively while milk prices rose by 10% and cattle by 6.7%.

The USDA is forecasting farm production expenses to increase by \$18.2 billion (4.1%) from 2022 to reach \$459.5 billion in 2023. When adjusted for inflation, production expenses are forecast to increase by 1.3% from 2022 to 2023, remaining below the record-high level of 2014.

Feed expenses, the largest single expense category,

Global Commodity Price Indices Jan 2020 - Jan 2023, 2010=100



Higher energy and fertiliser prices, therefore, lead to higher farm production costs and higher food prices. The impacts are being felt across many countries.

In Canada for example farm input costs rose by 18% between Q3 2021 and Q3 2022, with fertiliser costs rising by 45% and machinery fuel costs by 47%. The FCC predicts continued increases in 2023, although the rate will be significantly lower. It projects a 5% increase in crop input expenses in Western Canada in 2023, and a 13% increase for the corn-soybean-wheat dominated rotations in Ontario.

Irish farm input costs jumped by 35% in 2022 while returns to farmers for agricultural outputs rose 27%, according to the latest figures from the Central Statistics Office. The inputs that rose the most last

are forecast at \$72.7 billion in 2023, falling \$3.9 billion (5.1%) from 2022. This reduction, however, follows a projected \$11.3 billion (17.4%) increase in 2022. When adjusted for inflation, both 2022 and 2023 feed expense levels remain high but below the peaks of 2012–14. Fertilizer-lime-soil conditioner expenses, the second largest category, are forecast to have reached a record high in 2022 at \$42.5 billion. They are expected to remain high at \$42.2 billion in 2023, decreasing by \$0.3 billion (or 0.8%) as compared with 2022.

The impact on farm incomes into 2023 is expected to be negative. Farmers are often price takers and unable to pass on costs to consumers in the same way that many food manufacturers can. The USDA forecast that in inflation-adjusted dollars, 2022 net



farm income will decrease by \$0.9 billion (0.6%). Net cash farm income is forecast to increase by \$13.5 billion (8.7%) compared with 2021. Farm cash receipts in 2023 are forecast to decrease by \$23.6 billion (4.3%) from 2022 to \$519.9 billion in 2023.

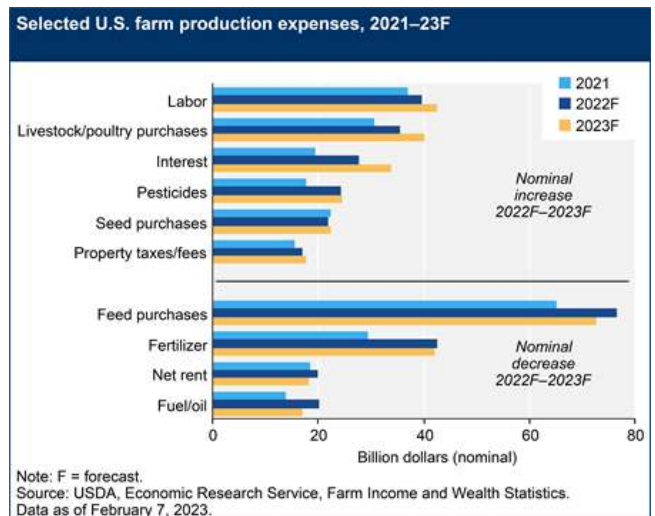
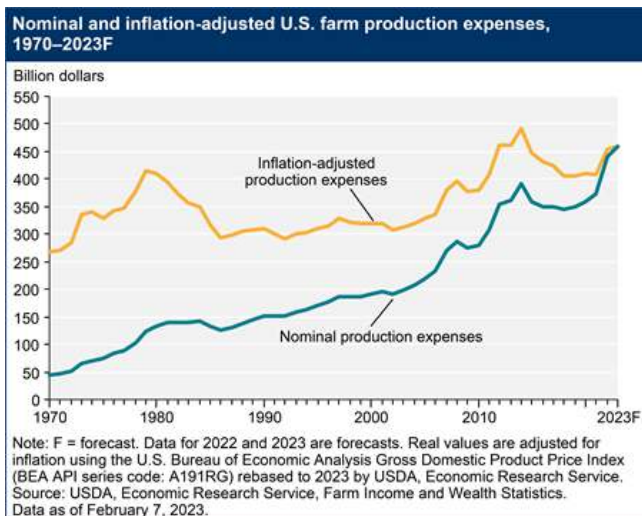
Farmers are reportedly cutting back on many inputs, including fertilisers, and crop protection and attempting to minimise cultivation to save fuel. In the US total production expenses are forecast to increase by \$18.2 billion (4.1%) in 2023 to \$459.5 billion. Interest expenses and livestock/poultry purchases are expected to increase in 2023 while spending on feed and fuels/oils is expected to decline relative to 2022.

More expensive inputs will lead to reduced yields, and increased risk and loss due to pests and disease. It does not just impact the farm level. The impact of increased energy prices is being felt throughout the supply chain.

How are policymakers responding to rising energy prices?

Are there specific policies to alleviate fuel and fertiliser prices? According to the IEA (International Energy Agency), short-term policy concerning energy and fertilisers could include the following:

- **Enhance international dialogue and cooperation on energy and food supply security.** Phasing out trade restrictions on fertilisers can help ease tensions in food markets.
- **Incentivise and enable food growers to increase the efficiency of nutrient use.** Some regions of the world do not use enough nitrogen fertilisers and some use too much. Adopting good practices such as the “4Rs” of nutrient stewardship can help achieve better use of fertiliser.



It is reported that high energy prices are testing the resilience of EU food manufacturers. According to Rabobank, the share of energy within total food manufacturing costs has risen from 2% in 2019 to 7.5 to 10% in 2022. In some energy-intensive sectors such as baking, milling, and fruit and vegetable processing it is now as much as 30%.

Different impacts on different sectors for example growing tomatoes in heated greenhouses in Northern Europe have become much more expensive [10]. This means that retailers may turn to producers within Southern Europe, the Mediterranean and the Middle East. Crop production tends to be more energy intensive than livestock production.

This means applying the right fertiliser source, at the right rate, at the right time, and in the right place.

- **Alleviate pressure on natural gas and oil markets by adopting short-term measures to reduce demand.** In response to the energy market disruptions resulting from Russia’s invasion of Ukraine, the IEA provided a range of recommendations to reduce natural gas and oil demand. IEA recommended measures included speed restrictions on roads and measures to encourage people to work from home.

Policy responses have to date focused on measures to protect consumers from price inflation, rather than



long-term changes to food and farming policies, however, food price inflation has stimulated debate on the need for increased food production in some countries.

People in low-income countries are most vulnerable to higher prices because food accounts for 44% of consumption on average, compared with 28% in emerging market economies and 16% in advanced economies. Even within wealthy nations increased food and energy prices impact disproportionately the least well-off. According to the IMF, price signals are essential to let supply and demand adjust, and countries should refrain from preventing domestic price rises but instead focus on protecting vulnerable groups within their populations.

Fuel subsidies prevalent in many oil-exporting countries in the Middle East, North Africa, and sub-Saharan Africa are a big part of the reason why consumers in those regions may be feeling less pain at the pump, albeit at the expense of mounting fiscal costs and thus, in many cases, future cuts in other public services

Price controls on food and energy are also common in Emerging Europe and Central Asia, but much less so in advanced economies and emerging market comparators elsewhere, possibly reflecting the history of central planning in the 20th century. For instance, Hungary has capped the price of food staples and fuel. Price controls are easy to communicate and implement, but they encourage waste and often result in shortages. Low-income households may also not be able to get hold of price-capped goods in the first place.

For example, some countries have scaled up means-tested support programmes targeting low-income households. In Poland, for instance, an allowance for households will provide a maximum of €106 per person per year, depending on income, the type of heating, and the number of people in the household. Such means-tested measures are well-targeted and may avoid excessive energy usage, depending on their design. For instance, giving a household a voucher (rather than a discount on the price per unit) does not alter the price that the consumer must pay for an additional unit of electricity. However, reaching out to the households that are most in need requires a high level of administrative capacity.

Considering the long-term impact of rising energy prices on food production

High energy prices are likely to make all within the food supply chain more cautious. A reduced appetite for risk will hinder investment. Food manufacturers are less likely to invest in R&D and New product development, whilst farmers are likely to further reduce the planting of certain crops.

There is no quick fix to ease rising food and fuel prices, and high prices for these essentials are likely for some time. All businesses within the food supply chain need to consider their options. Many will look to reduce costs by scaling back production or investing in new technology to make their farms more efficient to help maintain incomes. Policymakers need to consider how best to encourage investment in food and energy, whilst at the same time putting in place measures to protect vulnerable groups of consumers.



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