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The Ukraine war and threats to food and energy security

Cascading risks from rising prices and supply disruptions

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Summary

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- Russia’s invasion of Ukraine has shocked global politics and markets. While there is uncertainty over how the war will develop, it is certain that its ramifications will be both long-lasting and far-reaching for societies around the world.
 - Both Russia and Ukraine are important to global resource markets, particularly for energy, food and fertilizers. Economic sanctions, trade restrictions and policy interventions introduced by national and regional governments, in response to the invasion, have led to a rapid ‘spike’ in prices for these commodities. This trend has been further exacerbated by disruption to supply chains and fears of potential supply shortfalls.
 - Before the conflict, demand in energy, food and fertilizer markets was already running ahead of supplies and driving up prices. Following the COVID-19 pandemic, a global cost-of-living crisis had ensued, characterized by rising levels of energy and food poverty. These conditions will be significantly worsened by the war in Ukraine.
 - High prices for energy and food pose immediate threats to human security, particularly among low-income and vulnerable populations in all economies and against a backdrop of post-pandemic inflation and limited fiscal capacity. These threats may also trigger cascading risks, which may combine with existing socio-economic and political stresses to spark unrest and even further conflict in other parts of the world. The potential for coincident price or supply shocks – including as a consequence of climate change – further amplifies the risk.
 - Mitigating the most immediate harms to populations at home and abroad may be a top priority for policymakers, but failure to keep long-term objectives in mind – climate change mitigation, in particular – can lead to bad decisions that further embed existing fragilities in economic and social systems.
 - The Russia–Ukraine crisis poses new challenges to the international community, but the cascading risks that it is amplifying – supply-chain disruptions, market volatility, resource insecurity, the displacement of people and significant geopolitical change – are already part of a new reality in the face of climate change.
 - Governments must invest now to build the long-term resilience of societies and economies against global shocks of the scale that has been witnessed over the past two years, firstly the COVID-19 pandemic and now Russia’s war in Ukraine. They should take measures that mitigate both the ongoing impacts of the situation in Ukraine and the longer-term risks of market disruption and geopolitical upheaval (‘no-regrets’ measures). These might include prioritizing resource-demand reduction and system changes to improve resilience and mitigate market volatility.

01

Introduction

Russia's war in Ukraine has shaken both global politics and international resource markets, and is likely to result in long-term impacts on economies and societies around the world.

Russia's invasion of Ukraine continues to be a seismic global event, the full implications of which the rest of the world is still struggling to grasp. On the battlefield, where Russia may have hoped for a quick and easy victory, the war has now moved into a more attritional phase. Russia cannot control Ukraine, and Ukraine cannot eject Russian forces from its territory. As of early April 2022, a supposedly unstoppable force has been met by a seemingly immovable object.

The Russian government's immediate political objective – ensuring that Ukraine ceases to pivot towards the West – is not being realized by military means. How might the impasse be resolved? There are five plausible scenarios for how this war of attrition might play out:

- A long-term stalemate, which might last months, or years;
- A ceasefire, involving territorial concessions by Ukraine;
- Ukraine's collapse, as a consequence of Russia's victory;
- Russia's declaration of victory and withdrawal – with the objectives *claimed* to have been met;
- Russia's collapse, and a change of regime.

Despite uncertainty over how the war may develop, the Ukrainian population is firmly united (a survey conducted in mid-March by Ukraine's Rating Group revealed that 93 per cent of respondents believed that Ukraine would win, and 98 per cent saw Russia as a hostile country¹). Were it to achieve victory, Ukraine's post-war future may be bolstered by generous amounts of support and aid from the West and the potential acceleration of the process to join the European Union (EU). Meanwhile, the long-term future of Russia in terms of the international economy

¹ Rating Group (2022), 'The fifth national poll: Ukraine during the war', https://ratinggroup.ua/en/research/ukraine/pyaty_obschenacionalnyy_opros_ukraina_v_usloviyah_voyny_18_marta_2022.html.

is uncertain. The invasion of Ukraine, ordered by Russian President Vladimir Putin, has brought to the fore certain challenges that Russia's economy has faced for some time (notably its carbon- and mineral-dependent economy and an ongoing 'brain drain'). In addition, many (though not all) countries and institutions are turning away from transactions with Russia, as the repercussions of the invasion and the manner in which the war is being conducted become increasingly apparent. In short, Russia has become somewhat of a pariah.

The geopolitical backdrop

The world has experienced a number of destabilizing events over the last decade and a half. Among these have been the 2007–08 financial and food price crises; the 2010–11 food price crisis and the 'Arab Spring' popular uprisings, in which soaring food prices played a significant role; the war in Syria; increased migration and growing populations of displaced peoples; the rise of populism across the world, exemplified by the election of Donald Trump as US president in 2016; significant trade disruptions, including the US–China trade 'war'; the UK's exit from the EU; the COVID-19 pandemic; and, in 2021, the disordered withdrawal of US troops from Afghanistan. Throughout this period, multilateral processes have been weakened, political leadership has often been lacking, and global unity has appeared low.

The invasion of Ukraine by Russia in February 2022 marked a return to state-on-state warfare – something Europe had not experienced since 1945 – and has demonstrated the complete disrespect of the Russian leadership for international law.

The current global crisis brings new challenges. The invasion of Ukraine by Russia in February 2022 marked a return to state-on-state warfare – something Europe had not experienced since 1945 – and has demonstrated the complete disrespect of the Russian leadership for international law; it is an event of major historical consequence. From a security perspective, the immediate effect, beyond the suffering of the population of Ukraine, has been to strengthen the commitment of Western nations to multilateral institutions, in particular NATO and the EU. To prevent further aggression and respond to the enhanced threat to NATO and EU nations that border Russia, there is a requirement for effective deterrence, both conventional and nuclear, delivered through defence forces that are strong in terms of both capability and scale. Germany has already pledged to spend €100 billion of its 2022 budget on national defence,² and there have long been calls (notably from France) for the establishment of a pan-European defence force to deter future aggression on the part of Putin or other leaders with similar aspirations.

² DW (2022), 'Germany commits €100 billion to defense spending', 27 February 2022, <https://www.dw.com/en/germany-commits-100-billion-to-defense-spending/a-60933724>.

Collectively, NATO and the EU will need to make it clear that, if necessary, they would be prepared to use these forces. However, there is no certainty of such a commitment from all NATO and EU members; already there are signs that resolve is weakening in some quarters, with the UK chancellor of the exchequer reported in late March to be resisting additional increases in defence spending.³

In addition to such hard security implications, the conflict raises the possibility of a restructuring of international trade. It is not known when the significant number of sanctions against Russia may be lifted and if, or when, others may be deployed. Russia may move to impose counter-sanctions or export bans, and other countries may do the same if they feel their interests are harmed by sanctions on Russia – China, for example, has threatened such action.⁴

Even if the war ended today, these sanctions will continue to interrupt the flow of goods from Russia into global markets to a significant extent. As unity strengthens within the Euro-Atlantic community, and as China looks likely to align more closely with Russia, the conflict – and the responses it has triggered among governments and industry worldwide – have the potential to prompt significant reconfigurations in markets to which Russia has to date been a major supplier: namely, energy, food and fertilizers.

The role of Ukraine and Russia in global resource markets

The war in Ukraine has very serious implications for global food and energy markets, which in turn have the potential to yield cascading impacts on economies and societies around the world.

Russia and Ukraine are both significant players in global energy, food and fertilizer markets. Russia is the world's third largest producer and exporter of oil; the second largest producer and the largest exporter of natural gas; and the third largest exporter of coal (thermal and coking).⁵ Russia is also the world's largest exporter of wheat and the second largest exporter of sunflower oil. Ukraine is equally significant to global food markets, as the largest exporter of sunflower oil, the fourth largest exporter of maize and the fifth largest exporter of wheat.⁶ Russia also dominates global trade in fertilizers: it is the largest exporter of fertilizers overall, the second largest exporter of nitrogenous fertilizers and the third largest exporter of potassic (those containing potassium) fertilizers.⁷

Russia is also an important supplier of metals and minerals, particularly of nickel, palladium, platinum and titanium, as well as aluminium, copper and uranium.⁸ While disruptions to mineral and metal supply chains will almost certainly affect

³ Parker, G. (2022), 'Rishi Sunak resists rise in defence spending despite war in Ukraine', *Financial Times*, 20 March 2022, <https://www.ft.com/content/adf0b92d-861d-4d9f-b584-c401138b5232>.

⁴ Langley, W. et al. (2022), 'China warns of retaliation if hit by Russia sanctions fallout', *Financial Times*, 15 March 2022, <https://www.ft.com/content/2b46df50-c6ab-4d58-9eef-5d3fb86905b1>.

⁵ BP (2021), 'Statistical Review of World Energy', <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>.

⁶ Chatham House (2020), 'Resource Trade Earth Dashboard', <https://resourcetrade.earth>.

⁷ Chatham House (2020), 'Resource Trade Earth Dashboard'.

⁸ Chatham House (2020), 'Resource Trade Earth Dashboard'.

production in a number of industrial sectors in the coming months, any changes to the prices or availability of food and energy will have more immediate impacts on the day-to-day experience of people and businesses around the world.

The potential for cascading risks

With the conflict in Ukraine unlikely to be resolved in the short term, its impact on global resource markets will continue to strengthen, and with it the probability of very serious ‘ripple effects’ on economies and societies around the world. These ripple effects are often referred to as ‘risk cascades’, and they can very quickly have negative impacts in geographies and sectors far removed from the original event.

Past situations can provide an indication of the potential for cascading risks. Prior to the current crisis, the most dramatic food price ‘spike’ on record occurred in 2010–11. This was driven by an extreme heatwave affecting agricultural production in Ukraine and western Russia.⁹ Yields fell by 30 per cent in some regions, with a significant impact on export volumes. The resulting market runs, accelerated by export restrictions from producer countries nervous about their own food security, drove rapid food price inflation that affected families around the world, necessitating food aid for the economically marginalized (in the UK, for example, emergency demand at food banks run by the Trussell Trust more than doubled in 2012–13 compared with the previous year¹⁰). The food price crisis also led to food riots in many countries and was a contributory factor to the Arab Spring,¹¹ the geopolitical reconfiguration of the Middle East¹² and the ‘migrant crisis’ in Europe.¹³ This in turn gave rise to increasing nationalist and populist sentiment in a number of countries, and had political consequences for European unity over the following decade.¹⁴

The current conflict in Ukraine may bring even more severe and far-reaching cascading risks. The potential scale of physical and economic disruptions to food and energy markets increases with every week the war continues, as Russia becomes increasingly disengaged from the global community and governments around the world respond. And, unlike the 2010–11 food price spikes, this conflict is playing out against a backdrop of existing and exceptional upheaval to global supply chains in the wake of the COVID-19 pandemic and an already severe global cost-of-living crisis.

⁹ Challinor, A. J. et al. (2018), ‘Transmission of climate risks across sectors and borders’, *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 376 (2121), <https://doi.org/10.1098/rsta.2017.0301>.

¹⁰ The Trussell Trust (2013), ‘Biggest ever increase in UK foodbank use: 170% rise in numbers turning to foodbanks in last 12 months’, 24 April 2013, <http://www.trusselltrust.org/wp-content/uploads/sites/2/2015/06/BIGGEST-EVER-INCREASE-IN-UK-FOODBANK-USE.pdf>.

¹¹ Soffiantini, G. (2020), ‘Food insecurity and political instability during the Arab Spring’, *Global Food Security*, 26, <https://doi.org/10.1016/j.gfs.2020.100400>.

¹² Fahmi, G. (2021), ‘The Arab Spring 10 years on’, Chatham House Expert Comment, 26 January 2021, <https://www.chathamhouse.org/2021/01/arab-spring-10-years>.

¹³ Kingsley, P. (2015), ‘Arab spring prompts biggest migrant wave since second world war’, *Guardian*, 3 January 2015, <https://www.theguardian.com/world/commentisfree/2015/jan/03/arab-spring-migrant-wave-instability-war>.

¹⁴ Vohra, A. (2020), ‘The Arab Spring Changed Everything—in Europe’, *Foreign Policy*, 24 December 2020, <https://foreignpolicy.com/2020/12/24/the-arab-spring-changed-everything-in-europe>.

The scope of this paper

This paper begins by discussing the socio-economic and resource pressures facing the international community prior to Russia's invasion of Ukraine on 24 February 2022 (Chapter 2), before examining the direct impacts of the conflict on the complex and interconnected energy, food and fertilizer markets (Chapter 3). It then considers the potential for cascading economic, social and security risks around the world (Chapter 4). Finally, it discusses the ways in which policy and market responses witnessed to date – and those that might follow in the coming weeks and months – may mitigate or exacerbate cascading risks from the conflict, and explores the possible ramifications for international cooperation and security in the longer term (Chapter 5).

02

The pre-conflict economic climate

Before Russia's invasion of Ukraine, energy, food and fertilizer prices were already high following the COVID-19 pandemic and post-pandemic economic recovery.

Russia invaded Ukraine at a time of prolonged global economic disruption stemming from the COVID-19 pandemic. Some economies bounced back quickly after the demand shocks, leading to inflationary pressure and supply chain disruptions in 2021. These contributed to increasing energy and food prices, giving rise to a cost-of-living crisis as governments reduced pandemic-related economic support.

The importance of Russia and Ukraine to global resource markets

Understanding the importance of both Russia and Ukraine to global energy, food and fertilizer markets is crucial to anticipating how disruptions arising from the conflict may rapidly escalate into large-scale and long-term impacts on prices and access to resources. Fossil fuel energy and agri-food (including fertilizer) markets are highly concentrated, even small shifts in supply and demand can have profound consequences for price volatility and market stability. In the case of food, since most countries – including those that are major agricultural producers – depend on imports to meet domestic demand, even localized and limited supply shortfalls can prompt a global market response. Both the 2007–08 and 2010–11 food price crises arose out of small disruptions to global production; the fact that those disruptions occurred in economies that are major exporters to a tight market meant that they led in each case to an international price spike.

Markets are responsive to price changes – other major wheat producers reacted to the high prices of 2020–21, for example, by increasing planting, and the record harvests in 2021–22 increased stocks and the capacity to cover localized supply shocks.¹⁵ But short-term risks to markets remain: food and fertilizer price spikes can be particularly damaging for low-income countries that import a large share of their food supplies, and high input prices constrain the ability of producers to ramp up production.

Food and fertilizer exports

According to an assessment by the UN Conference on Trade and Development (UNCTAD) in early 2022, Russia and Ukraine collectively account for just over one-half of global trade in sunflower oil and seeds, around one-quarter of all traded wheat and barley, and around one-sixth of traded maize and rapeseed.¹⁶ The two countries are particularly critical suppliers to food-deficit countries across North Africa and the Middle East, sub-Saharan Africa and South and Southeast Asia: by way of example, together Russia and Ukraine account for 100 per cent of Somalia's wheat imports, over 80 per cent of Egypt's, 75 per cent of Sudan's, and over 90 per cent of Laos's;¹⁷ and for around 95 per cent of sunflower oil imports into China and India.¹⁸

Russia is also a significant supplier of fertilizers, exporting around one-sixth of global trade in potassic fertilizers, more than one-tenth of nitrogenous fertilizers, and around one-sixth of mixed fertilizers (containing two or more of nitrogen, potassium and phosphate).¹⁹ Its neighbour and ally Belarus, which had already been subjected to international sanctions prior to the conflict,²⁰ is also responsible for one-sixth of global potassic fertilizer exports.²¹ Together, Russia and Belarus account for around one-third of global potash exports, and form one-half of a cartelized global market (with the other half comprising Canada and the US) that dominates potash production and sets prices.²²

Much of South and Central America, West Africa and Europe – including Ukraine itself – are heavily reliant on Russia and Belarus for their fertilizer imports, especially for potash (Figure 1). In addition, Russia dominates in the export of natural gas to fuel production of nitrogenous fertilizers across Europe.

¹⁵ Nandy, S. (2022), 'Argentina ends 2021-22 wheat harvest at record 21.8 mil mt on robust yields', S&P Global Commodity Insights, 19 January 2022, <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/agriculture/011922-argentina-ends-2021-22-wheat-harvest-at-record-218-mil-mt-on-robust-yields>; Gross, S. (2022), 'Record wheat harvest in Australia now seen over 5% bigger', Bloomberg, 28 February 2022, <https://www.bloomberg.com/news/articles/2022-02-28/record-wheat-harvest-in-australia-now-seen-over-5-higher>; Bhardwaj, M. (2021), 'Indian farmers expect to harvest record wheat, rice crops this year', Reuters, 25 May 2021, <https://www.reuters.com/world/india/indian-farmers-expect-harvest-record-wheat-rice-crops-this-year-2021-05-25>.

¹⁶ United Nations Conference on Trade and Development (2022), *The Impact on Trade and Development of the War in Ukraine: UNCTAD Rapid Assessment*, https://unctad.org/system/files/official-document/osginf2022d1_en.pdf.

¹⁷ United Nations Conference on Trade and Development (2022), *The Impact on Trade and Development of the War in Ukraine*.

¹⁸ Chatham House (2020), 'Resource Trade Earth Dashboard'.

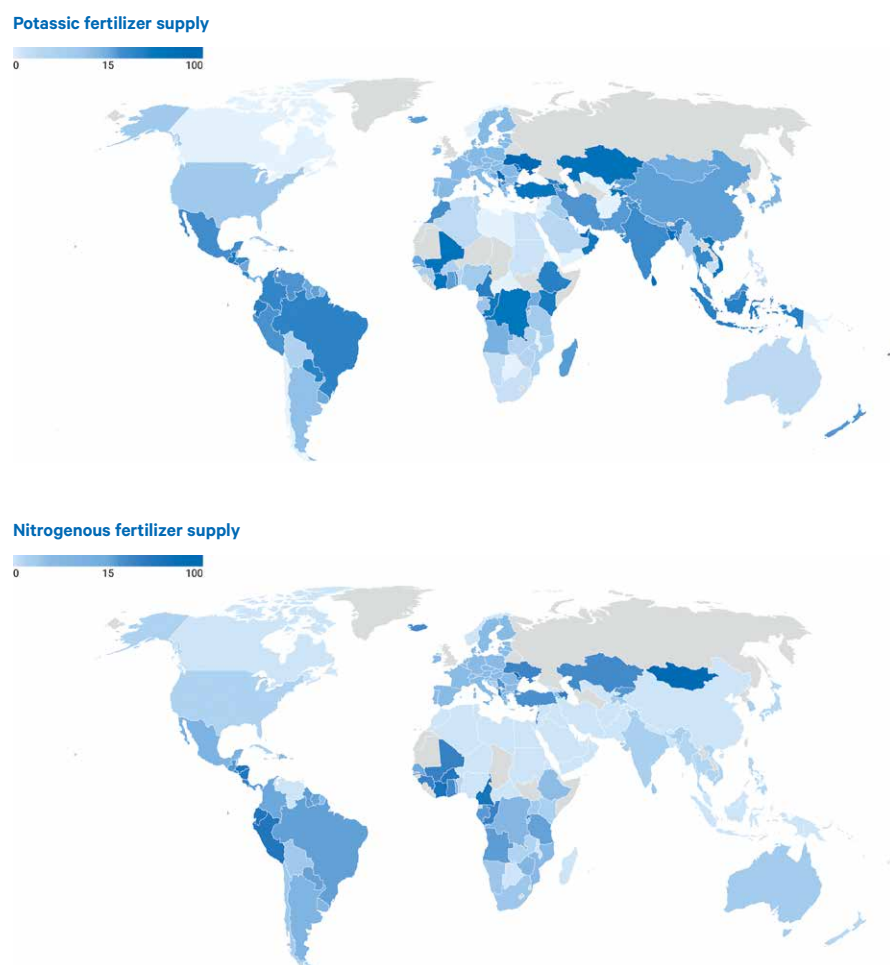
¹⁹ Chatham House (2020), 'Resource Trade Earth Dashboard'.

²⁰ Keen, K. (2022), 'Belarus struggling to find path to market for potash amid US sanctions', S&P Global Market Intelligence, 22 February 2022, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/belarus-struggling-to-find-path-to-market-for-potash-amid-us-sanctions-68990380>.

²¹ Chatham House (2020), 'Resource Trade Earth Dashboard'.

²² Kooroshy, J. and Preston, F. with Bradley, S. (2014), *Cartels and Competition in Minerals Markets: Challenges for Global Governance*, Research Paper, London: Royal Institute of International Affairs, https://www.chathamhouse.org/sites/default/files/field/field_document/20141219CartelsCompetitionMineralsMarketsKooroshyPrestonBradleyFinal.pdf.

Figure 1. Imports of Russian, Belarusian and Ukrainian fertilizers as a share of total supply 2018–20, by country (%)



Source: Glauber, J. and Laborde, D. (2022), 'How will Russia's invasion of Ukraine affect global food security?', Food Security Portal blog, 25 February 2022, <https://www.foodsecurityportal.org/node/1919>.

Note: Russia and Belarus account for the majority of exports from the three countries; Ukraine itself is heavily import dependent.

Energy exports

Russia is responsible for about 10 per cent of global energy production²³ and is a major exporter of all fossil fuels, accounting (by volume) for around 15 per cent of global coal trade, 10 per cent of global oil trade and 8 per cent of global gas trade in 2020. In that year, declining prices had led the total value of its fossil fuel exports to fall to \$159 billion, some way below the 2013 peak of \$414 billion.²⁴

The EU imports 90 per cent of its gas consumption, with Russia providing 41.1 per cent of the bloc's imports of natural gas (and 35 per cent of total EU consumption), as well as 26.9 per cent of imported oil (25 per cent of consumption)

²³ BP (2021), 'Statistical Review of World Energy'.

²⁴ Chatham House (2020), 'Resource Trade Earth Dashboard'.

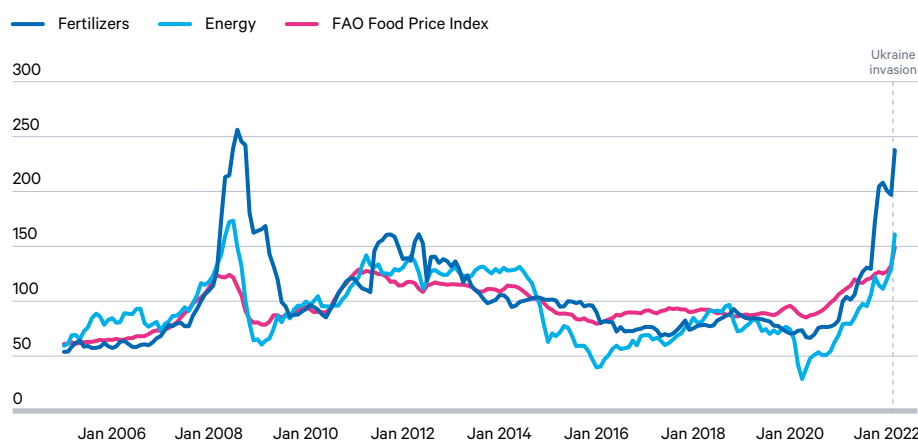
and 46.7 per cent of coal (20 per cent of consumption). Russia is by far the EU's largest source of imported energy; the EU imports 60 per cent of its total energy needs.²⁵ The UK is relatively independent of Russian energy exports, with only 4 per cent of its gas consumption and 8 per cent of oil consumption imported from Russia.²⁶

Russia is the second largest supplier of oil and the fourth largest of natural gas (pipeline and liquefied natural gas – LNG) to China, by volume, and China is Russia's second largest coal market.²⁷ However, Russia's exports of natural gas to China are expected to rise dramatically from about 10 billion cubic metres (m³) in 2020 to about 100 billion m³ by 2030, with the construction of new pipelines already being under way or approved²⁸ – in comparison the combined capacity of Nord Stream 1 and 2 connecting Russia to Germany is 110 billion m³.²⁹

Pre-conflict price rises and volatility

Pandemic-induced disruptions to global economies were having strong impacts on international commodity markets some months before Russia's invasion of Ukraine. Global energy prices, which affect many other commodity markets, are expected to be over 80 per cent higher on average in 2021 than in 2020 (Figure 2), causing significant inflationary and cost-of-living pressures as a result of rebounding demand and constrained supply.³⁰

Figure 2. Energy, food and fertilizer price indices 2005–22 (2010 = 100)



Source: World Bank Research & Outlook (2022), 'Commodity Markets', <https://www.worldbank.org/en/research/commodity-markets>; Food and Agriculture Organization of the UN (2022), 'World Food Situation, FAO Food Price Index', <https://www.fao.org/worldfoodsituation/foodpricesindex/en>.

²⁵ Eurostat (2021), 'Energy Overview', <https://ec.europa.eu/eurostat/web/energy>.

²⁶ Department for Business, Energy & Industrial Strategy, Prime Minister's Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP and The Rt Hon Boris Johnson MP (2022), 'UK to phase out Russian oil imports', press release, 8 March 2022, <https://www.gov.uk/government/news/uk-to-phase-out-russian-oil-imports>.

²⁷ BP (2021), 'Statistical Review of World Energy'.

²⁸ DW (2022), 'Russian gas boost fuels Moscow's China pivot', 12 January 2022, <https://www.dw.com/en/russian-gas-boost-fuels-moscows-china-pivot/a-60393843>.

²⁹ Clean Energy Wire (2022), 'Gas pipeline Nord Stream 2 links Germany to Russia, but splits Europe', 22 February 2022, <https://www.cleanenergywire.org/factsheets/gas-pipeline-nord-stream-2-links-germany-russia-splits-europe>.

³⁰ World Bank (2021), 'Soaring Energy Prices Pose Inflation Risks as Supply Constraints Persist', press release, 21 October 2021, <https://www.worldbank.org/en/news/press-release/2021/10/21/soaring-energy-prices-pose-inflation-risks-as-supply-constraints-persist>.

Prices in the energy sector have fluctuated considerably since early 2020, primarily as a consequence of the restrictions on movement and economic activity that were enacted by many governments to limit the public health impacts of the COVID-19 pandemic. As far fewer people commuted to work and restrictions were placed on international travel, demand for transport fuels fell, as did the price of oil. At the start of 2020, prior to the pandemic, oil was \$67 per barrel; it fell to \$17 per barrel at the start of April and rose to \$50 per barrel by the end of 2020 and to \$78 per barrel by the end of 2021.³¹

In early 2022, as concerns grew over Russian engagement in Ukraine, the oil price rose sharply. By 24 February it had surpassed \$100 per barrel, and two weeks into the conflict, on 9 March, it peaked at \$128 per barrel.³² Natural gas and coal prices followed similar trajectories at the start of the pandemic-induced global economic recession, as demand from factories slowed, and prices again rose at the start of 2022 due to geopolitical and market concerns. As tensions grew, it was noted by the International Energy Agency (IEA) that Gazprom had exported about 25 per cent less gas to Europe in the last three months of 2021 than in the same period of 2020.³³

Prior to the invasion of Ukraine, governments were preparing to respond to higher energy prices, which were having a serious impact on household income and rendering energy increasingly unaffordable for a growing percentage of the population – even in relatively wealthy OECD member countries. At the end of 2021, the World Bank noted that ‘the surge in energy prices poses significant near-term risks to global inflation and, if sustained, could also weigh on growth in energy-importing countries’.³⁴

Fertilizer prices had been rising hand-in-hand with energy prices throughout 2021, but took off in October to reach their most elevated level for 13 years (Figure 2). The same fundamental drivers of energy prices applied to the fertilizer sector (given the high energy requirements of nitrogenous fertilizer production), with additional constraints on supply arising from trade policy measures taken by individual countries. China, for example, suspended fertilizer exports – it is a major exporter of phosphate-based fertilizers – in July 2021 until June 2022 to ensure domestic availability, Russia announced restrictions on exports of nitrogenous and phosphate-based fertilizers for six months from December 2021, and sanctions had already been imposed on the state-owned Belarusian potassic fertilizer supplier Belaruskali by Canada, the EU, the UK and the US.³⁵ Supply constraints and price pressures could significantly curtail fertilizer use in forthcoming planting seasons, especially in the most price-sensitive markets.

³¹ OPEC (2022), ‘OPEC Basket Price’, https://www.opec.org/opec_web/en/data_graphs/40.htm (accessed 7 Apr. 2022).

³² OPEC (2022), ‘OPEC Basket Price’.

³³ Ambrose, J. (2022), ‘Russia is orchestrating Europe’s gas crisis, says energy agency boss’, *Guardian*, 12 January 2022, <https://www.theguardian.com/business/2022/jan/12/russia-europe-gas-crisis-international-energy-agency-boss>.

³⁴ World Bank (2021), ‘Soaring Energy Prices Pose Inflation Risks as Supply Constraints Persist’.

³⁵ Baffes, J. and Chian Koh, W. (2021), ‘Soaring fertilizer prices add to inflationary pressures and food security concerns’, World Bank blogs, 15 November 2021, <https://blogs.worldbank.org/opendata/soaring-fertilizer-prices-add-inflationary-pressures-and-food-security-concerns>; Reuters (2021), ‘China’s major fertiliser makers to suspend exports amid tight supplies’, 30 July 2021, <https://www.reuters.com/article/us-china-exports-fertilisers-idUSKBN2F007W>; Keen (2022), ‘Belarus struggling to find path to market for potash amid US sanctions’.

Global food prices were already experiencing their sharpest and most sustained increases since the 2007–08 and 2010–11 food price crises, well before conflict concerns were being priced in. At the end of 2021 they were very close to the previous all-time highs of 2011; by February 2022 this peak had been exceeded. While this trend reflects generalized price increases across all food commodity types, meat prices have remained relatively stable and prices for vegetable oils have shown the most dramatic increases.

Global food prices were already experiencing their sharpest and most sustained increases since the 2007–08 and 2010–11 food price crises, well before conflict concerns were being priced in.

Unlike the previous food price crises, which were driven by initial supply constraints and subsequent trade restrictions, the marked increases of early 2022 have largely reflected demand recovery from the early stages of the COVID-19 pandemic and the associated logistical challenges. The stranding of empty shipping containers in Europe and the US in early 2020, during a period of global lockdowns, had slowed supply chains and increased the cost of shipping when Western consumer demand for Asian goods recovered;³⁶ rising energy prices have fed into agricultural input prices, and increasing demand from the biodiesel sector has also directly contributed to the rise in prices for vegetable oils; recovering demand for grain from China has also contributed, as the country has sought to restore reserves to support the restructuring of its agricultural sector following the 2018–19 outbreak of African swine fever.³⁷ Planting of crops (for harvest in the summer of 2022) has, in part, responded to higher prices on forward markets. The US Department of Agriculture estimated that the acreage of wheat planted in the US would increase by about 3 per cent in 2022.³⁸ Whether this mitigates any of the risks discussed in Chapter 4 depends on multiple issues, including the availability of fertilizers during the coming months of the northern growing season, the subsequent southern planting season, the weather, and the capacity to transport harvested grain to where it might most be needed.

The energy transition and its ramifications for Russia

Calls have strengthened from many quarters over the past two decades for the transformation of economies and societies to a more sustainable model of development that tackles some of the fundamental issues contributing to

³⁶ Steer, G. and Romei, V. (2021), 'Shipping costs quadruple to record highs on China-Europe 'bottleneck'', *Financial Times*, 19 January 2021, <https://www.ft.com/content/ad5e1a80-cecf-4b18-9035-ee50be9adfc6>.

³⁷ OECD/Food and Agriculture Organization of the UN (2021), *OECD-FAO Agricultural Outlook 2021–2030*, Paris: OECD Publishing, <https://doi.org/10.1787/19428846-en>.

³⁸ U.S. Wheat Associates (2022), 'U.S. wheat highlights from USDA's first look at 2022/23', Wheat Letter blog, 28 February 2022, <https://www.uswheat.org/wheatletter/u-s-wheat-highlights-from-usdas-first-look-at-2022-23>.

recent crises. Chief among these are systemic inequities and human-driven climate change. Momentum has been building for a shift away from fossil fuels, in particular, and for more sustainable production and consumption of resources more generally, including within food systems.³⁹

For Russia, global efforts to realize more sustainable economies pose an existential threat to its own vision for economic growth. Ahead of the UN Framework Convention on Climate Change's 26th global summit (COP26) in 2021, pledges from over 130 countries – together responsible for around 88 per cent of global greenhouse gas emissions⁴⁰ – to achieve net zero by the middle of the 21st century signal an imminent decline in demand for Russian energy. Success in driving emissions down and meeting the collective target of limiting global temperature rise to 1.5°C above pre-industrial levels – as enshrined in the 2015 Paris Agreement – will require an accelerated reduction in the use of fossil fuels in the near term, a longer-term restructuring of global energy markets, the shifting of economic rents and a more diverse energy mix.⁴¹

Net importers will need to find ways to transform into more sustainable economies while avoiding the social risks of more expensive energy (and food). The EU has been strident in its commitment to the energy transition, but in the process it has increased its dependence on Russian energy, as domestic production has declined and investment in renewable energy has continued to be insufficient. Given the significant transition away from fossil fuels required to adhere to the Paris-aligned pathways, European dependence on Russia's resources is potentially temporary, but is currently as great as it has ever been.

As the world looks ahead to projected growth in demand for food, land is also becoming an increasingly strategic asset. Russia may well have factored Ukraine's fertile land into its decision to invade as a means of bolstering its future agricultural power;⁴² other neighbouring allies, particularly Belarus and Kazakhstan – major exporters of potash and wheat, respectively – may further add to its sphere of influence if they choose to align with Russia in any future economic war. In the face of the energy transition and declining fossil fuel export revenues, Russia will be looking with urgency for ways to maintain its economic and political power; the current situation shows that no strategy is off the table, whatever the consequences in terms of Russia's ostracization by the international community.

³⁹ See, for example, Intergovernmental Panel on Climate Change (2022), *Climate Change 2022: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Pörtner, H.-O. et al. (eds.)], Cambridge: Cambridge University Press, in press, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>; Intergovernmental Panel on Climate Change (2019), 'Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems' [Shukla, P. R. et al. (eds.)], <https://www.ipcc.ch/srccl/>; Åberg, A. et al. (2021), *COP26: What happened, what does this mean, and what happens next?*, Briefing Paper, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/2021/11/cop26-what-happened-what-does-mean-and-what-happens-next>; Willett, W. et al. (2019), 'Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems', 16 January 2019, *Lancet*, [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)31788-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31788-4/fulltext); UN Food Systems Summit 2021 Community (2021), 'Food Systems Summit Compendium', <https://foodsystems.community/food-systems-summit-compendium>.

⁴⁰ Net Zero Tracker (2022), 'Net Zero Tracker Beta Dashboard', <https://zerotracker.net>.

⁴¹ BP (2022), *Energy Outlook 2022*, <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2022.pdf>.

⁴² Ralby, I., Soud, D. and Ralby, R. (2022), 'Ukraine is Not Enough: Just the Beginning of Russia's Assault on the World', I.R. Consilium, 25 February 2022, <https://irconsilium.com/ukraine-is-not-enough-just-the-beginning-of-russias-assault-on-the-world>.

03

Direct impacts on energy and food markets

Economic sanctions and policy changes imposed by governments in response to Russia's invasion of Ukraine have led to price spikes in food and energy markets.

The conflict in Ukraine has led to immediate and significant logistical disruptions in the energy, food and fertilizer sectors, and to swift and robust responses from Western countries in the form of economic sanctions against Russia. Together, these have prompted rapid worldwide price rises for energy, food and fertilizer products.

Economic sanctions, trade restrictions and policy interventions

Unprecedented economic sanctions have been imposed on Russia since the start of this war. These began with broad economic sanctions against the Russian state apparatus and against individuals allied with President Putin, but are increasingly addressing the energy sector directly, with the aim of cutting off the oil and gas revenues that are financing the war. Sanctions introduced so far include EU bans on investment in Russia's energy sector and on dealings with Russian state-owned enterprises such as Gazprom and Rosneft, as well as sweeping commitments to phase out imports of Russian oil and gas, whether immediately – in the case of

the US⁴³ – or at a later date. For example, the UK government has pledged to end dependency on Russian oil and coal by the end of 2022, and on Russian gas as soon as possible thereafter.⁴⁴

The higher dependency of certain EU member states on Russian energy imports makes fossil fuel sanctions more economically and politically difficult – particularly so for Germany, for example – but pressure is mounting. In April, Charles Michel, the president of the European Council, stated in a speech to the European Parliament that the EU was proposing to introduce a ban on Russian coal imports, and that he believed ‘that measures on oil and even on gas will also be needed sooner or later’.⁴⁵ Josep Borrell Fontelles, the high representative of the European Union for foreign affairs and security policy, also told the parliament on the same day that the EU had paid Russia €35 billion for energy since the start of the war.⁴⁶ Meanwhile, the US government has prohibited American companies from investing in the expansion of Russian energy production, and US citizens from investing in foreign firms participating in Russian energy production.

Governments have, however, held back on implementing the strongest possible measures – including a full embargo on energy imports – partly due to the challenge of diversifying away from Russian imports and partly in order to maintain leverage in the event of further escalation. In the meantime, Russian gas continues to flow.

In light of the high dependency of the EU on Russian gas imports and the immediate impact of the war on European citizens, by way of both potential reductions in supply and the increased flow of refugees from Ukraine into EU countries, the European Commission introduced a proposal, agreed in principle by the European Council, that will see a rapid decline in the use of Russian fossil fuels and their complete phase-out by the end of the decade.⁴⁷ In addition to a review of energy markets (with proposals from the commission expected in May 2022), the possible introduction of an emergency windfall tax on upstream energy companies and the redirection of revenues from emissions trading systems to aid consumers, the main elements of the proposal to reduce the use of Russian gas by 60 per cent in 2022 include:

- Expanded imports of LNG and diversification of pipeline gas, as well as the production of renewable gas;
- Increased energy efficiency in homes, including through behavioural change, accelerating the rollout of heat pumps; and
- Accelerated deployment of renewables.

⁴³ The White House (2022), ‘Factsheet: United States Bans Imports of Russian Oil, Liquefied Natural Gas and Coal’, press release, 18 March 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/08/fact-sheet-united-states-bans-imports-of-russian-oil-liquefied-natural-gas-and-coal>.

⁴⁴ Foreign, Commonwealth & Development Office and The Rt Hon Elizabeth Truss (2022), ‘UK imposes sweeping new sanctions to starve Putin’s war machine’, press release, 6 April 2022, <https://www.gov.uk/government/news/uk-imposes-sweeping-new-sanctions-to-starve-putins-war-machine>.

⁴⁵ European Council (2022), ‘Report by President Charles Michel to the European Parliament plenary session’, 6 April 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/04/06/report-by-president-charles-michel-to-the-european-parliament-plenary-session>.

⁴⁶ Lynch, S., Gijs, C. and Vela, J. H. (2022), ‘Michel: EU needs to sanction Russian oil and gas ‘sooner or later’’, Politico, 6 April 2022, <https://www.politico.eu/article/eu-move-ban-russia-oil-gas>.

⁴⁷ European Commission (2022), ‘REPowerEU: Joint European action for more affordable, secure and sustainable energy’, press release, 8 March 2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1511.

The UK government's energy security response has been different, favouring politically more expedient, longer-term supply measures and holding back support for demand reduction and onshore wind generation, which could be realized more rapidly.⁴⁸ Notably, in contrast to the EU, the UK strategy proposes a new round of licences for North Sea oil and gas projects, together with investment in nuclear power and offshore wind.⁴⁹

In food markets, a wave of export restrictions have been introduced since the start of the conflict. In early March, Ukraine introduced a ban on the export of wheat and other goods;⁵⁰ though, by this time, shipments out of the country had already ground to a halt with the closure of the country's ports.⁵¹ Despite commitments and calls from the G7 agriculture ministers,⁵² the Agricultural Market Information System (AMIS) Rapid Response Forum⁵³ and the Food and Agriculture Organization of the UN (FAO) director-general⁵⁴ to keep global food and fertilizer trade open, transparent and free from speculative behaviour, some countries have already moved to impose export restrictions. Ukraine and Russia have both banned fertilizer exports.⁵⁵ In mid-March, Russia banned the export of wheat, maize and other cereals to Armenia, Kazakhstan and Kyrgyzstan,⁵⁶ while Egypt, Hungary, Indonesia, Moldova and Serbia have all imposed export bans on staple crops.⁵⁷

Economic sanctions are expected to constrain global supply of nitrogenous fertilizers (which depend on nitrogen and gas exports from Russia), potassic fertilizers (which depend on potash exports from Belarus and Russia) and phosphate-based fertilizers (with Russia being a major exporter of phosphates). These fertilizers are needed now for spring wheat in the Northern Hemisphere (in Canada, the EU, Russia, Ukraine and the US, for example) and maize in Europe, and will soon be needed for the planting season in the Southern Hemisphere.

⁴⁸ Harrabin, R. (2022), 'Energy strategy: UK plans eight new nuclear reactors to boost production', BBC News, 6 April 2022, <https://www.bbc.co.uk/news/business-61010605>.

⁴⁹ Department for Business, Energy & Industrial Strategy, Prime Minister's Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP, The Rt Hon Boris Johnson MP and The Rt Hon Greg Hands MP (2022), 'Major acceleration of homegrown power in Britain's plan for greater energy independence', 6 April 2022, <https://www.gov.uk/government/news/major-acceleration-of-homegrown-power-in-britains-plan-for-greater-energy-independence>.

⁵⁰ Food and Agriculture Organization of the UN (2022), 'Ukraine suspends exports of some food products', Food Price Monitoring and Analysis, 9 March 2022, <https://www.fao.org/giews/food-prices/food-policies/detail/en/c/1476888>.

⁵¹ Devitt, P., Stolyarov, G. and Zinets, N. (2022), 'Ukraine shuts ports as conflict threatens grain supplies', Reuters, 24 February 2022, <https://www.reuters.com/world/europe/russia-halts-vessel-movement-azov-sea-black-sea-open-2022-02-24>.

⁵² G7 Germany (2022), *G7 Extraordinary Agriculture Ministers' Meeting*, press release, 11 March 2022, <https://www.fas.usda.gov/sites/default/files/2022-03/g7-extraordinary-meeting-statement.pdf>.

⁵³ Agricultural Market Information System (2022), 'Joint statement of the extraordinary meeting of the AMIS Rapid Response Forum', 5 March 2022, <http://www.amis-outlook.org/news/detail/en/c/1155468>.

⁵⁴ Food and Agriculture Organization of the UN (2022), 'New Scenarios on Global Food Security based on Russia-Ukraine Conflict', 11 March 2022, <https://www.fao.org/director-general/news/news-article/en/c/1476480>.

⁵⁵ Pavel, P. (2022), 'Ukraine bans fertilizer exports – agriculture ministry', Reuters, 12 March 2022, <https://www.reuters.com/world/europe/ukraine-bans-fertilizer-exports-agriculture-ministry-2022-03-12>;

Thomas, A., Bland, W. and Bobylov, A. (2022), 'Russia bans ammonium nitrate exports until April to support domestic farmers', S&P Global Commodity Insights, 2 February 2022, <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/agriculture/020222-russia-bans-ammonium-nitrate-exports-until-april-to-support-domestic-farmers>.

⁵⁶ Food and Agriculture Organization of the UN (2022), 'Russian Federation bans exports of wheat, maize and other cereals to Armenia, Kazakhstan and Kyrgyzstan until 30 June 2022', Food Price Monitoring and Analysis, 15 March 2022, <https://www.fao.org/giews/food-prices/food-policies/detail/en/c/1477294>.

⁵⁷ Food and Agriculture Organization of the UN (2022), 'Food Price Monitoring and Analysis Database', <https://www.fao.org/giews/food-prices/food-policies/en>; Hunt, N. (2022), 'Food crisis grows as spiralling prices spark export ban', Reuters, 9 March 2022, <https://www.reuters.com/world/food-crisis-grows-spiralling-prices-spark-export-bans-2022-03-09>; Wardany, S. and Wahba, A. (2022), 'Egypt to Ban Exports of Staple Foods to Safeguard Reserves', Bloomberg, 10 March 2022, <https://www.bloomberg.com/news/articles/2022-03-10/egypt-to-ban-exports-of-staple-foods-to-safeguard-reserves>.

Price increases in energy and food markets

Russia and Ukraine's importance as energy and food producers is such that the conflict has shaken global markets. The threat of an interruption of energy supply from Russia has triggered unprecedented price rises in fossil fuels: as of 6 April 2022, oil was \$108 per barrel, having been below \$80 per barrel at the turn of the year;⁵⁸ natural gas in Europe very briefly reached €345 per megawatt hour (MWh) in March, up from €100 per MWh;⁵⁹ and the Australian futures price of coal rose to \$435/tonne in the first half of March – its highest price ever, and triple the price at the start of the year.⁶⁰ While Russia is an important producer globally, it is not the sole determinant of prices, and decisions taken by the Organization of the Petroleum Exporting Countries (OPEC) will significantly determine further price trends, with some analysts suggesting that oil could reach between \$200–250 per barrel later in 2022.⁶¹ If Russian production were restricted, the desire and the ability to ramp up production to relieve the tightness in the market would prevent further price rises.

Even before the Ukraine conflict began, many fertilizer producers in Europe were struggling to maintain their operations amid high gas prices, with two UK plants shutting down in 2021.

In the EU, the relative inflexibility of the movement of gas (the majority of which is pumped along fixed pipes) and the importance of Russian supply led to the particularly large price spike. The likelihood of long-term disruption to natural gas supply and a potential switch to coal in Europe sent a strong demand signal to carbon futures markets, with the price of carbon rising to nearly €100/tonne in the first three months of 2022, up from €60/tonne in November 2021.

High energy prices will have secondary impacts on the price of fertilizer, and will threaten the economic viability of its production. Even before the Ukraine conflict began, many fertilizer producers in Europe were struggling to maintain their operations amid high gas prices, with two UK plants shutting down in 2021.⁶² Moreover, there is historical precedent for high gas prices forcing the

⁵⁸ Organization of the Petroleum Exporting Countries (2022), 'OPEC Basket Price'.

⁵⁹ Quantum Commodity Intelligence (2022), 'European natural gas price collapse continues, TTF slumps 19%', 10 March 2022, <https://www.qcintel.com/article/european-natural-gas-price-collapse-continues-ttf-slumps-19-4665.html>.

⁶⁰ Proctor, D. (2022), 'Coal Use Rises, Prices Soar as War Impacts Energy Markets', PowerMag, 8 March 2022, <https://www.powermag.com/coal-use-rises-prices-soar-as-war-impacts-energy-markets>.

⁶¹ Duguid, K., Romei, V. and Wilson, T. (2022), 'Will Opec increase oil output as Russia disruption lifts prices?', *Financial Times*, 27 March 2022, <https://www.ft.com/content/648e0f28-3dd4-4132-af53-fb9490f6ac11>.

⁶² Wearden, G. (2021), 'Gas crisis forces two UK fertiliser plants to halt work; US retail sales beat forecasts - as it happened', *Guardian*, 16 September 2021, <https://www.theguardian.com/business/live/2021/sep/16/evergrande-crisis-energy-prices-factories-markets-ftse-dow-us-jobless-business-live>.

closure of plants.⁶³ The current high price of fertilizer is already changing farming practice through reductions in areas sown and amounts of fertilizer applied, which will further constrain food supply in the near future.

Since February, forward markets for grains have risen significantly. Wheat futures for the forthcoming harvest were trading at 41 per cent higher on 23 March than on 1 February, and 21 per cent higher than on the day of Russia's invasion.⁶⁴ Wheat futures for December 2022, reflecting the next harvest, were at 35 per cent and 18 per cent for the same dates, indicating that the market expects long-running disruption. Maize futures were 17 per cent above 1 February prices on 23 March, and even soya – with few direct impacts on its availability as a result of the conflict – was up by 8 per cent.⁶⁵

Conflict-related supply disruptions

The bombing of infrastructure, including a nuclear power station (see Box 1) and the besiegement of major cities by Russian troops, together with the deliberate sabotage of critical assets by Ukrainian forces, have resulted in immediate and significant disruption to logistical supply chains in Ukraine – both in the energy, food and fertilizer markets, and beyond (see Box 2).

The movement of goods in and out of the Black Sea region has become both more logistically challenging and significantly more expensive in the wake of the conflict, particularly with the closing of Ukraine's ports. The designation of the Black Sea and Sea of Azov as 'high risk' areas for shipping has pushed up insurance premiums in that industry,⁶⁶ while fears over further sanctions on seaborne trade have prompted some shipping companies to freeze deals with Russian suppliers.⁶⁷ Vessels face delays at ports elsewhere as additional customs checks are undertaken to ensure that no sanctions have been infringed.⁶⁸ Rail connections between Ukraine and Russia were destroyed by Ukrainian troops soon after Russia's invasion,⁶⁹ and the transit of rail freight between Asia and Europe is expected to be disrupted in the longer term both by economic sanctions and by private sector boycotts,⁷⁰ likely prompting a shift to other modalities such as shipping. Impacts

⁶³ Bailey, R. and Wellesley, L. (2017), *Chokepoints and Vulnerabilities in Global Food Trade*, Report, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/2017/06/chokepoints-and-vulnerabilities-global-food-trade>.

⁶⁴ See *Wall Street Journal*, 'Market data', available at <https://www.wsj.com/market-data>.

⁶⁵ See *Wall Street Journal*, 'Market data'.

⁶⁶ Agricultural Market Information System (2022), 'AMIS Market Monitor: No. 96 March 2022', <http://www.amis-outlook.org/amis-monitoring/monthly-report/en/#.YjsEC5bLc2w>.

⁶⁷ Meade, R. (2022), 'Shipping shuns Russia risk as sanctions fuel rocketing rates', *Lloyd's List*, 27 February 2022, <https://lloydlist.maritimeintelligence.informa.com/LL1139986/Shipping-shuns-Russia-risk-as-sanctions-fuel-rocketing-rates>.

⁶⁸ Millard, R., Warrington, J. and Bottaro, G. (2022), 'Russia to blame for energy crisis sweeping Europe, declares IEA', *New York Times*, 12 January 2022, <https://www.nytimes.com/2022/03/11/business/russia-ukraine-shipping-cargo.html>.

⁶⁹ Rocco, M. et al. (2022), 'Ukraine conflict round-up: Russian forces continue to face strong resistance', *Financial Times*, 26 February 2022, <https://www.ft.com/content/39377eaa-9d8e-4cbd-8e5e-43619459bab7#post-61ee99fc-2378-48cb-bd91-a61562b90ee0>.

⁷⁰ Leijen, M. (2022), 'Sanctions or not: these companies stop transit through Russia', *Rail Freight*, 3 March 2022, <https://www.railfreight.com/railfreight/2022/03/03/sanctions-or-not-these-companies-stop-transit-through-russia>.

of the conflict on transportation costs are already becoming evident in the US: as demand for wheat pivots from the Black Sea to the US, the costs of exporting grain from the Gulf of Mexico have risen to a near eight-year high.⁷¹

Russia's invasion occurred at a critical time for the country's grain and oilseed producers. The majority of the previous season's grain, sunflower oil and sunflower seed was exported before the invasion. Total export volumes for the 2021–22 crop year were up 29 per cent for Ukraine,⁷² but down by about 21 per cent for Russia,⁷³ leaving overall exports from those countries broadly similar to 2020–21. The main growing season in Ukraine normally begins in late March to April, when spring crops are planted, and is concluded by August;⁷⁴ winter wheat and barley were planted in autumn 2021. Many activities are unlikely to be possible this year: even if farmers can reach their fields, they are short of fertilizers, pesticides, herbicides and fuel for farm machinery.⁷⁵ Many of Ukraine's most important growing regions – particularly for barley, maize, sunflower seed and wheat – are located in the east and northeast of the country, where the conflict has been most intense.⁷⁶ FAO predicts that 'between 20 and 30 percent of the areas under winter cereals, maize and sunflower seed in Ukraine will either not be planted or remain unharvested during 2022–23 season, with the yields of these crops also likely to be adversely affected'.⁷⁷

Downstream operations have also been disrupted and recalibrated: Ukraine's leading food supplier has been prioritizing humanitarian food distributions within the country,⁷⁸ while, on the day of the invasion, Bunge – one of the major oilseed companies operating in Ukraine – closed its crushing facilities in Dnipro and Nikolaev.⁷⁹

⁷¹ Hirtzer, M. and Carey, D. (2022), 'U.S. Grain Shipping Costs Soar With War and Drought Swinging Demand', Yahoo News, 19 March 2022, <https://uk.news.yahoo.com/u-grain-shipping-costs-soar-162518129.html>.

⁷² Nandy, S. (2022), 'Ukraine's 2021-22 wheat exports up 29% on year, prices stabilize', S&P Global Commodity Insights, 25 January 2022, <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/agriculture/012522-ukraines-2021-22-wheat-exports-up-29-on-year-prices-stabilize>.

⁷³ Nandy, S. (2022), 'Russia's 2021-22 wheat exports fall 21% on year, prices recover slightly', S&P Global Commodity Insights, 24 January 2022, <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/agriculture/012422-russias-2021-22-wheat-exports-fall-21-on-year-prices-recover-slightly>.

⁷⁴ Food and Agriculture Organization of the UN, Global Information and Early Warning System on Food and Agriculture (undated), 'Earth Observation', <https://www.fao.org/giews/earthobservation/country/index.jsp?lang=en&code=UKR>.

⁷⁵ Tamman, M., Gauthier-Villars, D., Mcfarlane, S. and El Safty, E. (2022), 'Ukraine's farmers stalled, fueling fears of global food shortages', Reuters, 11 March 2022, <https://www.reuters.com/world/ukraines-farmers-stalled-fueling-fears-global-food-shortages-2022-03-11>.

⁷⁶ US Department of Agriculture, Foreign Agricultural Service (undated), 'Ukraine, Moldova and Belarus – Crop Production Maps', https://ipad.fas.usda.gov/rssiws/al/up_cropprod.aspx.

⁷⁷ Food and Agriculture Organization of the UN (2022), *Information Note: The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict*, <https://www.fao.org/3/cb9013en/cb9013en.pdf>.

⁷⁸ Terazono, E. et al. (2022), 'Russia's invasion to have 'enormous impact' on world food supplies', *Financial Times*, 13 March 2022, <https://www.ft.com/content/ad225932-5600-432f-b8bf-e31b8050c73a>.

⁷⁹ Plume, K. (2022), 'Bunge shuts Ukraine offices, suspends crushing at two oilseed plants after Russian invasion', Reuters, 24 February 2022, <https://www.reuters.com/business/energy/bunge-shuts-ukraine-offices-suspends-crushing-two-oilseed-plants-after-russian-2022-02-24>.

Box 1. Nuclear energy in a conflict zone

Ukraine operates 15 nuclear reactors at four separate nuclear power plants, which between them provide about one-half of the country's electricity. The Chernobyl nuclear power plant is also located in the country. In 1986, Unit 4 at Chernobyl exploded and a subsequent fire spread radiation across Europe, making it by far the world's worst civilian nuclear accident.

The Russian rocket attack on the operating Zaporizhzhya nuclear power plant in the east of Ukraine on 4 March 2022 was unprecedented. Modern nuclear power plants such as Zaporizhzhya – which houses six water-water energetic (VVE) 1000 reactors, making it one of the largest nuclear power plants in Europe – have a secondary containment structure around the reactors designed to withstand missile attacks. However, damage to less well-protected equipment such as power lines or backup generators can threaten the integrity of a power plant. During the 4 March attack, damage was caused to the transformer of Zaporizhzhya's Unit 6, which then took a month to repair.

The attack against Zaporizhzhya serves both to reduce immediate power output for civilian use and to terrorize the population. According to the International Atomic Energy Agency (IAEA), on 5 April seven reactors in Ukraine were still in operation, including two at Zaporizhzhya.⁸⁰ Halving the output from nuclear power will add to existing supply burdens in Ukraine.

Russia also took over the site of the Chernobyl nuclear power plant (although, by 1 April, it was being reported that Russian troops were leaving the area), damaged a nuclear research institute in the city of Kharkiv, and, according to the Ukrainian authorities, hit a nuclear waste disposal site near Kyiv during missile strikes.⁸¹

Despite the conflict, gas has continued to flow from Russia to the EU, with around one-half of those flows transiting Ukraine. At the end of March 2022, Gazprom said that it was supplying natural gas in line with requests from European countries⁸² but, on 25 March, the Russian government announced that Gazprom would have 'to accept payments in roubles'. Current economic sanctions make this very difficult for Western buyers, and prices have spiked further in response. With many of the supply contracts stipulating payments in US dollars or euros, and with the German government advising companies against paying in roubles,⁸³ Russia changed its position on 5 April, announcing that the move to payment in roubles would be

⁸⁰ International Atomic Energy Agency (2022), 'Update 33 – IAEA Director General Statement on Situation in Ukraine', 5 April 2022, <https://www.iaea.org/newscenter/pressreleases/update-43-iaea-director-general-statement-on-situation-in-ukraine>.

⁸¹ International Atomic Energy Agency (2022), 'Update 14 – IAEA Director General Statement on Situation in Ukraine', 7 March 2022, <https://www.iaea.org/newscenter/pressreleases/update-14-iaea-director-general-statement-on-situation-in-ukraine>.

⁸² Reuters (2022), 'Russia's Gazprom says gas exports to Europe via Ukraine continue', 26 March 2022, <https://www.reuters.com/business/energy/russias-gazprom-says-gas-exports-europe-via-ukraine-continue-2022-03-26>.

⁸³ Reuters (2022), 'Russia warns West: gas bills in roubles are just days away', 25 March 2022, <https://www.reuters.com/business/energy/gazprom-has-4-days-work-out-rouble-payments-gas-exports-kremlin-says-2022-03-25>.

incremental for ‘unfriendly states’, rather than immediate.⁸⁴ Despite the war, Russia continues to pay Ukraine for gas transit rights. However, if international financial sanctions are expanded to exclude Russia altogether from the SWIFT international payments system, this would increasingly affect the ability of both Russia and other countries to pay for, and to determine the currency of payment for, commodities such as gas.

Russia has also continued to export oil, although exports from the Caspian Pipeline Consortium were halted at the end of March. This was apparently due to storm damage, with the company claiming that repair work could be delayed due to the unwillingness of Western companies to supply parts. The shutdown halted the export of 1.4 million barrels a day of oil and led to a 5 per cent rise in the price of Brent crude.⁸⁵ Flows of electricity have changed in recent years, with Ukraine having decoupled from the Russian electricity grid and become fully synchronized to the European network. The connection on 16 March of the Ukrainian and Moldovan grids was already planned, but has been accelerated to help increase grid stability in Ukraine.⁸⁶

Box 2. Supply-chain disruptions beyond energy, food and fertilizers

Additional supply-chain disruptions and economic ripple effects from the war include the worsening of the current semiconductor supply shortages. Before Russia’s invasion of Ukraine, the latter provided about one-half of the world’s supplies of neon – a gas needed for high-precision laser equipment used to manufacture microchips.⁸⁷ Furthermore, Russia provided a large share of US supplies of palladium, used in semiconductors and catalytic converters.⁸⁸ Chip shortages cost automotive companies \$210 billion in revenues in 2021,⁸⁹ while microchips are also key components for many renewable energy technologies, including electric vehicles, wind turbines and solar photovoltaic (PV) equipment. Russia is a significant exporter of titanium, which is used in the aerospace industry because of its relatively low weight, indicating potential disruption to the aerospace supply chain.⁹⁰ Other important Russian metals exports include nickel, aluminium and copper.

⁸⁴ RT (2022), ‘Russia’s gas-for-rubles payment schedule explained’, 5 April 2022, <https://www.rt.com/business/553333-russia-gas-rubles-payment-explained>.

⁸⁵ Brower, D. and McCormick, M. (2022), ‘Major Russian pipeline fully halts oil exports, sending crude prices higher’, *Financial Times*, 23 March 2022, <https://www.ft.com/content/9d6fe3e6-597f-4089-a553-3f8a0edc18e8>.

⁸⁶ European Commission (2022), ‘Statement by Commissioner for Energy Kadri Simson on Synchronisation of the Continental European Electricity Grid with Ukraine and Moldova’, 16 March 2022, https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_1789.

⁸⁷ Foreign Policy (2022), ‘How Will New Export Controls Impact The Global Semiconductor Shortage?’, *FP Insider*, 17 March 2022, <https://foreignpolicy.com/2022/03/17/russia-us-china-semiconductors-export-controls-sanctions-eu>.

⁸⁸ Hewileil, R. (2022), ‘The neon shortage is a bad sign’, *Vox*, 18 March 2022, <https://www.vox.com/recode/22983468/neon-shortage-chips-semiconductors-russia-ukraine>.

⁸⁹ Gavioli, S. (2021), ‘Semiconductors shortage and the risk of an energy transition failure’, IARI, 27 October 2021, <https://iari.site/2021/10/27/semiconductors-shortage-and-the-risk-of-an-energy-transition-failure>.

⁹⁰ Dai, T. (2022), ‘Russia’s war with Ukraine could permanently reshape the global supply chain’, *Fast Company*, 15 March 2022, <https://www.fastcompany.com/90731234/russias-war-with-ukraine-could-permanently-reshape-the-global-supply-chain>.

Sanctions have now begun to be imposed on Russian metals exports, with the EU banning key iron and steel imports as part of its fourth wave of sanctions,⁹¹ and with the UK applying additional tariffs of 35 per cent on a range of imports, including copper, lead, primary aluminium, and aluminium alloy.⁹² However, the imposition of significant sanctions on Russian exports of metals and minerals does have the potential to increase traded prices where alternatives cannot be delivered quickly. So too does the prospect of damage to production capacity, as seen with Russia's bombing of the Azovstal iron and steel works in Mariupol, one of Europe's largest iron and steel facilities. Concerns about disruption have raised prices for key London Metal Exchange contracts such as for aluminium during March, with knock-on effects for delivered prices increasing costs for industry and, in the longer term, potentially raising the cost of deploying energy-efficiency, renewable-energy and clean-energy technologies that are crucial to alleviating dependence on Russian oil and gas.

Private sector actors have also stepped back from engagement with Russia. A number of oil and gas companies have announced that they would exit their share of oil and gas fields or companies. These include BP's 20 per cent stake in Rosneft; ExxonMobil's participation in the Sakhalin-I project in eastern Russia; Shell's joint venture with Gazprom in the Sakhalin-II project; and all of Norwegian company Equinor's Russian ventures. In the food and fertilizer sectors, a number of major private sector companies have discontinued or reduced operations in Russia: Bayer – a key supplier of agricultural inputs in Russia – has made its supply for 2023 contingent upon Russia 'stopping its unprovoked attacks on Ukraine and returning to a path of international diplomacy and peace.'⁹³ The agribusiness conglomerates Bunge and Cargill have announced the suspension of new investments and of their export businesses in Russia (although their existing grain and oilseed operations continue);⁹⁴ while ADM – another large agribusiness – has said it will scale back its activities in Russia.⁹⁵ Meanwhile, the mining firm Rio Tinto has also exited its joint venture with Russian aluminium producer Rusal.⁹⁶

⁹¹ Aarup, S. A. (2022), 'EU hits Russia with new sanctions on luxury goods, metals and energy projects', Politico, 11 March 2022, <https://www.politico.eu/article/brussels-set-to-slam-russia-with-fresh-sanctions-on-luxury-goods-iron-steel-and-more>.

⁹² Shabalala, Z. and Onstad, E. (2022), 'London Metal Exchange bans some Russian metal from British warehouses', Reuters, 1 April 2022, <https://www.reuters.com/business/london-metal-exchange-suspends-some-russian-metal-its-uk-warehouses-2022-04-01>.

⁹³ Bayer (2022), 'Bayer Statement on Ukraine', Bayer Global, 16 March 2022, <https://www.bayer.com/en/ukraine>.

⁹⁴ Plume, K. (2022), 'Bunge Says New Export Business From Russia Suspended, Oilseed Crushing Continues', Successful Farming via Reuters, 10 March 2022, <https://www.agriculture.com/markets/newswire/bunge-says-new-export-business-from-russia-suspended-oilseed-crushing-continues>.

⁹⁵ Soni, R. and Stauffer, C. (2022), 'Cargill, ADM to scale back business in Russia, keep open food facilities', Reuters, 11 March 2022, <https://www.reuters.com/business/cargill-scale-back-business-russia-keep-open-food-animal-feed-facilities-2022-03-11>.

⁹⁶ Butler, B. (2022), 'Rio Tinto to sever ties with Russian businesses over Ukraine war', *Guardian*, 10 March 2022, <https://www.theguardian.com/business/2022/mar/10/rio-tinto-to-sever-ties-with-russian-businesses-over-ukraine-war>.

04 Cascading risks from food and energy market impacts

Against the backdrop of an existing cost-of-living crisis, the conflict in Ukraine risks exacerbating food and energy poverty, adding to human insecurity and contributing to social unrest.

The world faces a possible ‘perfect storm’ of risks, in which rising food and energy insecurity adds to the current cost-of-living crisis, potentially leading to labour disputes, recession, social and civil unrest, and sovereign debt crises – all of which have the potential to spark further conflict. The implications of these risks go far beyond food and energy markets.

A worsening cost-of-living crisis

The COVID-19 pandemic threw into sharp relief the levels of inequality that exist both within and between countries.⁹⁷ Across high-, middle- and low-income countries, the poorest were the most vulnerable to the effects of the pandemic. During the initial

⁹⁷ Stiglitz, J. (2020), ‘Conquering the Great Divide’, International Monetary Fund Finance and Development, September 2020, <https://www.imf.org/external/pubs/ft/fandd/2020/09/COVID19-and-global-inequality-joseph-stiglitz.htm>; Adarov, A. (2022), ‘Global income inequality and the COVID-19 pandemic in three charts’, World Bank Blogs, 7 February 2022, <https://blogs.worldbank.org/developmenttalk/global-income-inequality-and-covid-19-pandemic-three-charts>.

lockdowns in 2020, low-income households had the lowest capacity to withstand income losses, which also fell disproportionately on these groups.

As lockdowns were lifted and economies began to recover in 2021, global demand for goods rebounded but supply chains in many sectors – including food – struggled to keep up.⁹⁸ This contributed to global inflationary pressure,⁹⁹ which was further exacerbated by rapidly rising energy prices during the Northern Hemisphere winter (see Chapter 2). The emerging cost-of-living squeeze was given extra impetus by governments reducing general economic and social support as pandemic risks receded.

Against this existing backdrop, as explained in Chapter 3, the conflict in Ukraine risks amplifying the cost-of-living crisis as price pressures hit consumers from multiple directions. Unprecedented price rises for food, fuel and other essential goods spell trouble for populations around the world, particularly at a time when governments are looking to reduce spending on social safety nets, and when governments within Europe are moving to increase spending on defence and national security. Individuals and families unable to absorb rising costs will be faced with extremely hard decisions.

Rising food prices and food insecurity

FAO has predicted price rises for food and animal feed of between 8 and 22 per cent above the already high levels seen at the start of 2022, with other major global suppliers filling only part of the shortfall in supply from Russia and Ukraine.¹⁰⁰ Since staple crops and oilseeds are substitutable in many global markets (wheat may be readily replaced by maize in many food value chains, for example), price rises for one food type can prompt similar price movements for other types.¹⁰¹ This is currently evident in most staple grain and oilseed prices, though, unlike in previous crises, prices for rice have remained relatively stable.

Price rises like this are of concern around the world, but particularly for low-income households, who spend large proportions of their incomes on food, much of which goes on staples. Low-income farmers are also vulnerable: their incomes are highly dependent on food sales, with little scope for timing those sales, for sharing risks or for making longer-term investments. Prices could also be driven up further if existing export restrictions (see Chapter 3) spark a wave of additional protectionist measures¹⁰² or a scramble among countries to stockpile, for fear of future supply being curtailed.¹⁰³

⁹⁸ Ellyat, H. (2021), 'Supply chain growth is already hitting global growth', CNBC, 18 October 2021, <https://www.cnn.com/2021/10/18/supply-chain-chaos-is-hitting-global-growth-and-could-get-worse.html>.

⁹⁹ Rushe, D. et al. (2022), 'The rise in global inflation – the hit to living standards across the world', *Guardian*, 11 February 2022, <https://www.theguardian.com/business/2022/feb/10/the-rise-in-global-inflation-the-hit-to-living-standards-across-the-world>.

¹⁰⁰ Food and Agriculture Organization of the UN (2022), *Information Note: The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict*.

¹⁰¹ Gardebroeck, C., Hernandez, M. A. and Robles, L. M. (2014), 'Market Interdependence and Volatility Transmission Among Major Crops', IFPRI Discussion Paper 01344, <http://dx.doi.org/10.2139/ssrn.2427322>.

¹⁰² Benton, T. G. (2017), 'Food security, trade and its impacts', *resourcetrade.earth*, 24 April 2017, <https://resourcetrade.earth/publications/food-security-trade-and-its-impacts>.

¹⁰³ Terazono, E., Saleh, H. and Reed, J. (2020), 'Countries follow consumers in stockpiling food', *Financial Times*, 5 April 2020, <https://www.ft.com/content/5c8cbc60-aec0-4f3d-b0e2-a5e44f0c6f74>.

FAO predicts that the number of undernourished people globally will increase by between 7.6 million and 13.1 million as a result of the situation in Ukraine and of the ripple effects on food prices and availability.¹⁰⁴ In addition to the immediate challenge of high food prices, high fertilizer prices will also likely contribute to lower yields, as farmers choose either not to plant this season or to plant without the requisite fertilizers. Low yields in this harvest year may curtail supply next year through the depletion of strategic reserves – at both household and national levels.

Household food security could face long-lasting impacts, as price transmission from international markets is often ‘sticky’ – meaning that domestic prices remain elevated even when international prices ease.¹⁰⁵ Countries that are dependent on food imports are at particular risk from continued international price volatility, since transmission of volatility from international markets is more common when imports fulfil a large part of domestic requirements.¹⁰⁶ Even before the Russia–Ukraine conflict, high prices were already constraining budgets in developing countries: the aggregate food import bill in those countries was expected to be nearly 20 per cent higher in 2021 than in 2020, with the majority of this increase, especially in low-income, food-deficit countries, being due to price increases rather than larger import volumes.¹⁰⁷ The overall pressure on countries and households worldwide could increase further if the sharp price rises for wheat and maize spill over to rice markets, as occurred in previous food price crises.¹⁰⁸

The capacity of humanitarian agencies to mitigate severe food insecurity will be constrained both by logistical disruptions following the conflict and by increasing costs. The World Food Programme (WFP) anticipates significant disruption to its shipments from Odesa destined for West Africa – including to Nigeria, where 8.7 million people are food insecure – for distribution from May.¹⁰⁹ Sourcing supplies from alternative destinations will bring both time delays and cost increases: the agency’s procurement bill is expected to increase by \$23 million per month as a result of the conflict’s impact on supply and prices, while transportation costs are expected to rise by \$6 million per month owing to high energy prices.¹¹⁰ For those in besieged cities within Ukraine, continued attacks on humanitarian corridors pose a direct threat to life. Aid agencies have struggled to reach people facing acute shortages of food, water and fuel trapped in Kharkiv, Mariupol and Sumy.¹¹¹

¹⁰⁴ Food and Agriculture Organization of the UN (2022), *Information Note: The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict*.

¹⁰⁵ King, R. (2015), ‘Anomaly or Augury? Global Food Prices Since 2007’, *IDS Bulletin*, 46(6), pp. 20–32, <https://doi.org/10.1111/1759-5436.12183>.

¹⁰⁶ Ceballos, F., Hernandez, M. A., Minot, N. and Robles, M. (2017), ‘Grain Prices and Volatility Transmission from International to Domestic Markets in Developing Countries’, *World Development*, 94, pp. 305–20, <http://dx.doi.org/10.1016/j.worlddev.2017.01.015>.

¹⁰⁷ Food and Agriculture Organization of the UN (2021), *Food Outlook – Biannual Report on Global Food Markets*, Rome: FAO, <https://www.fao.org/documents/card/en/c/cb7491en>.

¹⁰⁸ Gardebroek, Hernandez and Robles (2014), ‘Market Interdependence and Volatility Transmission Among Major Crops’.

¹⁰⁹ World Food Programme (WFP) (2022), ‘Food security implications of the Ukraine Conflict’, WFP, <https://www.wfp.org/publications/food-security-implications-ukraine-conflict>; WFP (2022), ‘North Eastern Nigeria emergency’, <https://www.wfp.org/emergencies/nigeria-emergency>.

¹¹⁰ WFP (2022), ‘Food security implications of the Ukraine Conflict’.

¹¹¹ France 24 (2022), ‘Aid agencies struggle to reach Ukraine’s besieged cities’, 19 March 2022, <https://www.france24.com/en/live-news/20220319-aid-agencies-struggle-to-reach-ukraine-s-beseiged-cities>; Chazan, G. (2022), ‘Hell on earth: survivors recount the assault on Mariupol’, *Financial Times*, 20 March 2022, <https://www.ft.com/content/af7996a9-8c16-4421-a5b3-390315d3c7dc>.

Rising energy prices and energy insecurity

As previously noted, global energy markets tightened prior to the invasion of Ukraine as activity returned to pre-pandemic levels. While this would have been difficult for many consumers and companies, higher prices were expected to quickly recede as output increased and as the global market balanced supply and demand. The conflict in Ukraine has drastically altered these predictions: for example, Goldman Sachs has stated that the world could now be facing one of the 'largest energy supply shocks ever', while other financial institutions and energy analysts, including Barclays and Rystad Energy, suggest worst-case scenarios leading to prices of \$200 per barrel.¹¹²

Higher energy prices in developing countries are particularly damaging, as much of the population already has to spend a higher percentage of their income on fuel.

Rising world market prices increase the revenues of all upstream oil and gas producers, whether for companies or for countries. At the start of 2022, Russia was receiving \$350 million per day from oil sales and \$200 million per day from the sale of gas worldwide. But at the beginning of March, it was receiving \$720 million a day for gas from Europe alone.¹¹³

Higher energy prices in developing countries are particularly damaging, as much of the population already has to spend a higher percentage of their income on fuel (often primarily needed for cooking or transport). The prospect of higher prices may lead to further supply shortages, as those who can afford to do so increase hoarding.¹¹⁴

Higher prices are also beginning to affect developed countries. The UK government defines 'fuel poor' households as those that would fall below the poverty line if they were to spend the amount required to cover their fuel costs.¹¹⁵ In 2020, an estimated 13.2 per cent of households (3.16 million) were in fuel poverty in England, 25 per cent in Scotland, 12 per cent in Wales and 18 per cent in Northern Ireland.¹¹⁶ However, as a consequence of the recent 54 per cent increase in the energy price cap for households – and a resulting rise in domestic energy bills, for a typical household, of about £700 to £2,000 per year¹¹⁷ – the number of households in fuel poverty in England may now reach

¹¹² Dareen, S. and Varghese, A. (2022), 'Goldman hikes crude price forecast, Barclays and Rystad warn of \$200 oil', Reuters, 8 March 2022, <https://www.reuters.com/markets/europe/goldman-raises-oil-price-forecasts-russia-supply-shock-2022-03-08>.

¹¹³ Tooze, A. (2022), 'Chartbook #93: Russia's \$720m per day gas windfall – the lopsided economic war', Chartbook, 6 March 2022, <https://adamtooze.substack.com/p/chartbook-93-russias-720m-per-day?s=r>.

¹¹⁴ Fröhlich, S. (2022), 'Rising fuel costs are crippling Africa's economies', Deutsche Welle, 2 March 2022, <https://www.dw.com/en/rising-fuel-costs-are-crippling-africas-economies/a-60964273>.

¹¹⁵ Turn2Us (undated), 'Fuel poverty – What is fuel poverty?', <https://www.turn2us.org.uk/Benefit-guides/Fuel-Poverty/What-is-fuel-poverty>.

¹¹⁶ House of Commons (2022), *Fuel Poverty*, 4 March 2022, <https://researchbriefings.files.parliament.uk/documents/CBP-8730/CBP-8730.pdf>.

¹¹⁷ Peachey, K. (2022), 'Energy price: Bill shock for millions as rises hit', BBC News, 2 April 2022, <https://www.bbc.co.uk/news/business-60943192>.

26.7 per cent (6.3 million) from 1 April 2022.¹¹⁸ If further anticipated rises in energy bills – amid predictions of bills reaching £3,000 per year – are introduced later in 2022, nearly one in every three UK households (8.5 million) could be classified as fuel-poor.¹¹⁹

So far, the UK government has refused to impose windfall taxes on record profits received by oil and gas companies, opting instead to deliver social protections in the form of cuts to fuel duty and through support for household energy bills.¹²⁰ This response has been described as negative for energy transition, as it promotes fossil fuel ‘demand construction’ rather than ‘demand destruction’, and as regressive in socio-economic terms for supporting relatively affluent car owners over the most vulnerable in society. In the EU, there is more openness to introducing a windfall tax. However, there is still hesitation among EU leaders: for example, the conclusions of the European Council summit meeting held in late March made no mention of such a policy.¹²¹

Natural gas is widely used in domestic heating in Europe. In the UK, home heating is the largest single use of gas, while domestic use of gas accounts for 40 per cent of total consumption in the EU.¹²² Consequently, demand is largely seasonal and gas consumption in Europe drops rapidly as summer approaches, thus relieving pressure on prices. Lower demand for gas enables storage facilities to be filled, and the EU has stated that replenishment of gas storage across the bloc should start as soon as possible, as storage can provide more than one-quarter of winter consumption needs. The European Commission has proposed a requirement that gas storage capacity for each member state be filled to a minimum of 80 per cent by November 2022, increasing to 90 per cent in subsequent years.¹²³

Risk cascades across societies

When households have very low incomes, they are forced into making hard choices, including whether to prioritize heating or food. Going without heating poses significant risks to health, particularly for the elderly, while energy poverty can drive people into risky behaviours such as using ovens to heat their homes. When food becomes unaffordable, families are forced to buy less of it: household food insecurity rose significantly in the UK following the introduction of COVID-19 restrictions and the subsequent loss of income for many families. In January 2022,

¹¹⁸ End Fuel Poverty Coalition (2022), ‘Historic government data doesn’t show true fuel poverty picture’, 24 February 2022, <https://www.endfuelpoverty.org.uk/historic-government-data-doesnt-show-true-fuel-poverty-picture>.

¹¹⁹ End Fuel Poverty Coalition (2022), ‘£3,000 energy bill could leave 8.5 million UK households in fuel poverty’, 5 March 2022, <https://www.endfuelpoverty.org.uk/3000-energy-bill-could-leave-8-5-million-uk-households-in-fuel-poverty>.

¹²⁰ HM Treasury (2022), ‘Millions to receive £350 boost to help with rising energy costs’, 3 February 2022, <https://www.gov.uk/government/news/millions-to-receive-350-boost-to-help-with-rising-energy-costs>.

¹²¹ European Council (2022), ‘European Council meeting (24 and 25 March 2022) – Conclusions’, <https://data.consilium.europa.eu/doc/document/ST-1-2022-INIT/en/pdf>.

¹²² European Union Agency for the Cooperation of Energy Regulators (2021), ‘Gas factsheet’, <https://www.acer.europa.eu/gas-factsheet>.

¹²³ European Commission (2022), ‘Questions and Answers on the new EU rules on gas storage’, 23 March 2022, https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_1937.

one in 10 adults in the UK experienced food insecurity (meaning that they skipped meals or went a whole day without eating).¹²⁴ About 30 per cent of the global population lacked access to adequate food in 2020.¹²⁵

The reality of a cost-of-living crisis can be both immediate and prolonged. People unable to access enough food, energy or water can quickly become more militant in their efforts to reach a level of household security. Perceptions of unjust policymaking, of weak governance or political instability can foment social unrest; the food price spikes of 2007–08 and 2010–11, and energy price spikes in 2007–08 and 2011–13 all resulted in riots.¹²⁶ These in turn can further undermine governance and have the potential to lead to state failure.

Systemic impacts of a cost-of-living crisis can be self-perpetuating. Some of these impacts are already happening. As more people struggle to fulfil basic needs, more require the help of social safety nets;¹²⁷ worsening physical and mental health contributes to lower productivity; and workers unable to afford the basics may well engage in labour disputes to secure higher pay.¹²⁸ Lack of access to an adequate diet, if prolonged, risks leading to an increase in the incidence of chronic malnutrition, which in turn increases morbidity and mortality, constrains cognitive and physical development and reduces both productivity and lifelong earning potential among affected individuals and their children.¹²⁹ Supply-chain disruptions create economic challenges for industry, as input prices rise and sales decline. This can lead to business failures and job losses.

All these impacts heighten the economic burden of the growing crisis on governments. The additional economic costs of responding to a conflict on the scale of that being waged in Ukraine, on top of the huge disruption caused by COVID-19 – as governments reinvest in defence, bolster national security, tackle the consequences of economy-wide inflation and re-evaluate their dependencies on global energy markets – could push economies into recession or create a sovereign debt crisis, further deepening existing household insecurity. For some EU countries, inflows of displaced people are likely to add pressure on available resources (see Box 3). In fragile economies in particular, these ripple effects have the potential to spread and escalate rapidly (see Box 4).

¹²⁴ Food Foundation (2022), 'Food Insecurity Tracking: Round 9 Survey, 18-20 January 2022', <https://foodfoundation.org.uk/initiatives/food-insecurity-tracking>.

¹²⁵ FAO, IFAD, UNICEF, WFP and WHO (2021), 'The State of Food Security and Nutrition in the World 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all', Rome: FAO, <https://doi.org/10.4060/cb5409en>.

¹²⁶ Natalini, D., Bravo, G. and Newman, E. (2020), 'Fuel riots: Definition, evidence and policy implications for a new type of energy-related conflict', *Energy Policy*, 147, 111885; Natalini, D., Bravo, G. and Wynne Jones, A. (2019), 'Global food security and food riots—an agent-based modelling approach', *Food Security: The Science, Sociology and Economics of Food Production and Access to Food*, 11(5), pp. 1153–1173.

¹²⁷ Caddick, D., Tims, S. and Stirling, A. (2022), '23.4 million people unable to afford the cost of living this spring', New Economics Foundation, 14 March 2022, <https://neweconomics.org/2022/03/23-4-million-people-unable-to-afford-the-cost-of-living>.

¹²⁸ Staton, B., Strauss, D. and Cumbo, J. (2022), 'Labour shortages and inflation: why UK labour relations are hotting up', *Financial Times*, 1 March 2022, <https://www.ft.com/content/8b601e59-1dd3-451c-84a0-e60b4d2eb835>.

¹²⁹ Wellesley, L. et al. (2020), *The Business Case for Investment in Nutrition*, Report, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/2020/07/business-case-investment-nutrition>; Akseer, N. et al. (2022), 'Economic costs of childhood stunting to the private sector in low- and middle-income countries', *Lancet*, 45(101320), 14 March 2022, <https://doi.org/10.1016/j.eclinm.2022.101320>.

Box 3. Maintaining energy and water supplies for the displaced

As of 4 April, more than 4.2 million refugees have fled Ukraine¹³⁰ and an additional 7.1 million people have been displaced internally in the country since Russia's invasion.¹³¹ Humanitarian needs are increasing exponentially. While much of the international debate following the invasion has focused on the potential impacts on European energy markets and prices, the invasion will also take a huge toll on access to, and the use of, basic services such as energy and water by these displaced people.¹³²

Although Ukrainians are unlikely to end up in long-term forced encampments and are legally allowed to stay in EU countries for one to three years without applying for asylum,¹³³ many will still face considerable protection and welfare issues. Providers of humanitarian aid are struggling to support those refugees exposed to freezing temperatures in flimsy or temporary structures, with local firefighters in Poland – as mandated by regional governments – being responsible for warming tents. In the medium term, a large influx of refugees over a short period of time will put pressure on local governments in Poland and elsewhere, which will struggle to ensure basic services like education, energy, health and water.¹³⁴ Although the response to the crisis from governments and refugee hosts has been rapid and generous, this momentum is ultimately unlikely to sustain itself, and significant investments in urban infrastructure will be required to match the needs of larger populations.

For those internally displaced or at risk of displacement within Ukraine, access to reliable power, water, food and fuel for cooking are increasingly critical, as is the continued functioning of waste treatment services. According to the Ukraine's Ministry of Energy, as of 22 March, more than 865,000 users in nearly 1,320 settlements across Ukraine remained without electricity, with 291,000 being cut off from gas supplies.¹³⁵ In cities such as Chernihiv and Kherson, failure of the water supply is also affecting the operations of hospitals and preventing the delivery of basic services.¹³⁶ It appears likely that Russian control of – or damage caused to – energy, water and waste treatment infrastructure will result in unreliable, polluting and hazardous conditions for many.¹³⁷ A wholesale post-war reconstruction effort will be needed to ensure that Ukraine's critical infrastructure is rebuilt effectively.

¹³⁰ UN High Commissioner for Refugees, Operational Data Portal (2022), 'Refugees fleeing Ukraine (since 24 February 2022)', <https://data2.unhcr.org/en/situations/ukraine>.

¹³¹ UN Migration (2022), *Ukraine Internal Displacement Report: General Population Survey, Round 2, 1 April 2022*, International Organization for Migration, https://displacement.iom.int/sites/default/files/public/reports/IOM_Ukraine%20Displacement%20Report_Round%202.pdf.

¹³² Grafham, O. (2019), *Energy Access and Forced Migration*, Abingdon: Routledge, <https://www.routledge.com/Energy-Access-and-Forced-Migration/Grafham/p/book/9781032082134>; Lahn, G. and Grafham, O. (2015), *Heat, light and power for refugees*, Report, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/sites/default/files/publications/research/2015-11-17-heat-light-power-refugees-lahn-grafham-final.pdf>.

¹³³ Council of the EU (2022), 'Ukraine: Council unanimously introduces temporary protection for persons fleeing the war', press release, 4 March 2022, <https://www.consilium.europa.eu/en/press/press-releases/2022/03/04/ukraine-council-introduces-temporary-protection-for-persons-fleeing-the-war>.

¹³⁴ Fallon, K. (2022), 'Polish mayors warn cities reaching capacity as Ukrainian arrivals rise', *Guardian*, 14 March 2022, <https://www.theguardian.com/global-development/2022/mar/14/ukrainian-refugees-polish-mayors-warn>.

¹³⁵ UN Office for the Coordination of Humanitarian Affairs (2022), *Situation report*, 23 March 2022, https://reliefweb.int/sites/reliefweb.int/files/resources/2022-03-23_Ukraine%20Humanitarian%20Impact%20SitRep.pdf.

¹³⁶ UN Office for the Coordination of Humanitarian Affairs (2022), *Situation report*.

¹³⁷ Zwijnenburg, W. (2022), 'Environment and Conflict Alert Ukraine: A first glimpse of the toxic toll of Russia's invasion of Ukraine', Pax for Peace, 9 March 2022, <https://paxforpeace.nl/news/overview/environment-and-conflict-alert-ukraine-a-first-glimpse-of-the-toxic-toll-of-russias-invasion-of-ukraine>.

In societies at risk from growing conflict-related squeezes on costs, further pressure may arise from non-conflict causes, including from weather conditions over the next months. The weather may crucially affect energy demand, with increased demand for air conditioning during periods of extreme heat, or for heating during cold periods, potentially adding more pressure to an already strained supply–demand balance. In food markets, climate extremes threaten supply in other major breadbasket regions. For example, current drought conditions in the southern plains of the US Midwest and dry weather in Western and Southern Europe may negatively impact wheat yields in both, further driving up global prices,¹³⁸ while La Niña has the potential to disrupt yields in South America during 2022.¹³⁹ With such weather extremes now the ‘new normal’ in a climate-changed world, the potential for coincidental ‘shock’ events in the food system has increased considerably.

Box 4. Destabilizing impacts in fragile economies: the cases of Egypt and Lebanon

Egypt is the largest importer of wheat in the world, importing around 23 million tonnes, worth \$5.6 billion, in 2020.¹⁴⁰ Over 80 per cent of these imports come from Russia and Ukraine.¹⁴¹

In February 2022, consumer prices rose by 8.8 per cent, driven by a 17.6 per cent increase in food and beverage costs.¹⁴² The prices of grain, bread and vegetables are expected to rise further as the war in Ukraine continues.¹⁴³ For the Egyptian government, the rising costs of wheat imports will be compounded by the financial burden of bread subsidies available to over 88 per cent of the population,¹⁴⁴ and by the high cost of sunflower oil (around 40 per cent of the country’s sunflower oil imports are usually sourced from Russia and Ukraine).¹⁴⁵ The country was already facing high levels of public debt prior to the crisis.

With over 70 per cent of the population already unable to afford a healthy diet,¹⁴⁶ any increase in food prices has the potential to stoke unrest. Anti-government protests in 2019 and 2020, though relatively small-scale, indicated existing dissatisfaction

¹³⁸ Gro Intelligence (2022), ‘Gro’s 2022 Watchlist: 9 Major Themes for Agriculture in the Year Ahead’, 10 January 2022, <https://gro-intelligence.com/insights/gro-s-2022-watchlist-9-major-themes-for-agriculture-in-the-year-ahead>; Agricultural Market Information System (undated), ‘AMIS Monitoring’, <http://www.amis-outlook.org/amis-monitoring>.

¹³⁹ Kesavan, M. (2022), ‘Factbox: La Nina wreaks havoc in South America, to keep corn, bean supply tight’, S&P Global, 18 February 2022, <https://www.spglobal.com/commodity-insights/en/market-insights/latest-news/agriculture/021822-factbox-la-nina-wreaks-havoc-in-south-america-to-keep-supply-tight>.

¹⁴⁰ Chatham House (2020), ‘Resource Trade Earth Dashboard’.

¹⁴¹ UN Conference on Trade and Development (2022), *The impact on trade and development of the war in Ukraine*, https://unctad.org/system/files/official-document/osginf2022d1_en.pdf.

¹⁴² Magdy, M. and Wahba, A. (2022), ‘Egypt inflation at highest since mid-2019 as food costs soar’, Bloomberg, 10 March 2022, <https://www.bloomberg.com/news/articles/2022-03-10/egypt-inflation-hits-highest-since-mid-2019-as-food-prices-soar>.

¹⁴³ Alarabiya News (2022), ‘Egypt inflation hits 10 per cent as Ukraine war impacts’, 10 March 2022, <https://english.alarabiya.net/business/economy/2022/03/10/Egypt-inflation-hits-10-percent-as-Ukraine-war-impacts>.

¹⁴⁴ Tanchum, M. (2022), ‘The Russia-Ukraine war has turned Egypt’s food crisis into an existential threat to the economy’, Middle East Institute, 3 March 2022, <https://www.mei.edu/publications/russia-ukraine-war-has-turned-egypts-food-crisis-existential-threat-economy>.

¹⁴⁵ Chatham House (2020), ‘Resource Trade Earth Dashboard’.

¹⁴⁶ Food and Agriculture Organization of the UN (2022), *Information Note: The importance of Ukraine and the Russian Federation for global agricultural markets and the risks associated with the current conflict*.

among segments of the Egyptian population.¹⁴⁷ Rapid food price inflation in 2011, and its contribution to household economic insecurity, was one factor behind the unrest and protests experienced as part of the Arab Spring. A shortfall in wheat exports from Russia and Ukraine was central in driving up prices in that instance.

Lebanon is a major wheat importer, with 68 per cent of imports coming from Ukraine and Russia.¹⁴⁸ In addition, 98 per cent of Lebanon's sunflower oil – its primary cooking oil – comes from Russia and Ukraine.¹⁴⁹

Before the Russia–Ukraine conflict, Lebanon was already in a state of financial collapse following years of political dysfunction and corruption.¹⁵⁰ Among the Lebanese people, trust in public institutions is extremely low, and the level of social protection offered by the state is inadequate.¹⁵¹

The World Bank has described the current crisis in Lebanon as one of the most severe of the past 100 years.¹⁵² By the end of 2021, nearly one-half of the population was food insecure, and by January 2022, the cost of the basic food basket was 1,140 per cent higher than in October 2019.¹⁵³ Against the backdrop of such severe economic insecurity at national and household level, prospects for sourcing critical resources from alternative suppliers are likely to be extremely limited. The impacts of further grain and vegetable oil price rises could therefore be devastating.

¹⁴⁷ Talimah, E. (2020), 'Egypt's September protests: indications and signs', *Middle East Monitor*, 25 September 2020, <https://www.middleeastmonitor.com/20200925-egypts-september-protests-indications-and-signs>.

¹⁴⁸ Chatham House (2020), 'Resource Trade Earth Dashboard'.

¹⁴⁹ Chatham House (2020), 'Resource Trade Earth Dashboard'.

¹⁵⁰ Blair, E. (2022), 'Explainer: Lebanon's financial crisis and how it happened', Reuters, 23 January 2022, <https://www.reuters.com/markets/rates-bonds/lebanons-financial-crisis-how-it-happened-2022-01-23>; Shehadi, N. (2020), 'Lebanon is paying the cost of its dysfunctional politics', Chatham House Expert Comment, 26 February 2020, <https://www.chathamhouse.org/2020/02/lebanon-paying-cost-its-dysfunctional-politics>.

¹⁵¹ Khatib, L. and Wallace, J. (2021), 'Lebanon's politics and politicians', Chatham House Explainer, 11 August 2021, <https://www.chathamhouse.org/2021/08/lebanons-politics>.

¹⁵² World Bank (2021), 'Lebanon sinking into one of the most severe global crises episodes, amidst deliberate inaction', press release, 1 June 2021, <https://www.worldbank.org/en/news/press-release/2021/05/01/lebanon-sinking-into-one-of-the-most-severe-global-crises-episodes>.

¹⁵³ World Food Programme (2022), *WFP Lebanon Country Brief*, February 2022, https://docs.wfp.org/api/documents/WFP-0000137483/download/?_ga=2.201710417.1958817864.1647513688-1742085453.1646403115.

05 Responding to direct and cascading risks amid uncertainty

As governments move to mitigate price rises and market volatility, they must commit to taking measures that build longer-term resilience to global shocks.

The conflict in Ukraine is driving governments to take rapid decisions on how to manage and mitigate the immediate and longer-term impacts on resource prices and on national and global economies. These decisions must respond to both direct and cascading risks, and are being taken in the context of considerable uncertainty, not least over how long the conflict will continue and whether it will spread beyond Ukraine.

The dangers of short-term policy responses

Two major crises experienced in the last 15 years – the 2007–08 financial crash and food price spike, and the COVID-19 pandemic – have prompted collective discussion in the international community to ‘build back better’. The pandemic, in particular, led to much political discourse about a green recovery and the potential to accelerate climate mitigation and sustainability efforts while

rebuilding economies. In both cases, however, the trend was to build back fast, rather than better. Opportunities for deep, structural change were missed and instead the world largely returned to ‘business as usual’.

Responses to the conflict in Ukraine risk a similar short-term focus on building back fast, rather than better. Governments are coming under pressure from multiple quarters to prioritize an agenda of self-sufficiency in energy and food, easing climate mitigation and environmental protection measures to allow for a ramping-up of production. In the UK, for example, the government released an energy security strategy in which it announced it intends to issue new oil and gas licences in the North Sea,¹⁵⁴ while Shell is reportedly revisiting its decision not to invest in the Cambo oil field off the west coast of Scotland.¹⁵⁵ In the EU, some farming organizations are calling for policymakers to waive environmental protection measures under the bloc’s Farm to Fork Strategy (part of its broader Green Deal) to allow for the expansion of feed-crop production.¹⁵⁶ Similar proposals are being seen in the US.¹⁵⁷

Such short-term thinking risks undermining key components of resilient systems (see Box 5). It also threatens global efforts to radically and rapidly reduce greenhouse gas emissions in line with international climate mitigation commitments. Moreover, the measures suggested above would do little to assuage the current situation: developing new conventional oil resources will not ease the supply–demand balance in the near term, since most new fields take over a decade from discovery to reaching average peak output;¹⁵⁸ and expanding the area under agricultural production in the EU may not contribute to higher overall production if fertilizer prices remain prohibitively high.

Box 5. Building more resilient economies: what is needed?

In recent decades, the pursuit of economic growth as one of the main goals of development has led to an increasingly interconnected world, characterized by just-in-time supply chains, rising inequality and efforts to maximize comparative advantage. This global interconnectedness has many benefits, but it also creates systemic fragility to events that disrupt supply – whether geopolitically led or hazard-led (such as through the COVID-19 pandemic or climate change impacts). As is increasingly apparent, this systemic fragility is undermining ways of life as crisis follows crisis.

¹⁵⁴ Department for Business, Energy & Industrial Strategy, Prime Minister’s Office, 10 Downing Street, The Rt Hon Kwasi Kwarteng MP and The Rt Hon Boris Johnson MP (2022), ‘British energy security strategy’, 7 April 2022, <https://www.gov.uk/government/publications/british-energy-security-strategy>.

¹⁵⁵ Jackson, R. (2022), ‘Shell reconsidering decision to pull out of controversial Cambo oil field in Scotland, claim reports’, *Scotsman*, 22 March 2022, <https://www.scotsman.com/news/politics/shell-reconsidering-decision-to-pull-out-of-controversial-cambo-oil-field-in-scotland-claim-reports-3621039>.

¹⁵⁶ Bounds, A. (2022), ‘EU reviews sustainable food plans as Ukraine war disrupts imports’, *Financial Times*, 20 March 2022, <https://www.ft.com/content/f99d784c-0448-4552-ab8b-e77ed68ea173>.

¹⁵⁷ Douglas, L., Walljasper, C. and Plume, K. (2022), ‘U.S. farm groups urge sowing on protected land as war cuts off Ukraine supply’, Reuters, 23 March 2022, <https://www.reuters.com/world/us/us-farm-groups-urge-sowing-protected-land-war-cuts-off-ukraine-supply-2022-03-23>.

¹⁵⁸ Wachtmeister, H. (2020), ‘Investment and production dynamics of conventional oil and unconventional tight oil: Implications for oil markets and climate strategies’, *Energy and Climate Change*, Volume 1, December 2020, <https://doi.org/10.1016/j.egycc.2020.100010>.

Building more resilient economies requires finding ways to better withstand disruptive events when they occur, for example through: functional redundancy in markets, such as maintaining strategic grain reserves that can act as a buffer in times of supply shortage or market volatility; diversity in supply chains and distribution networks, so that interruption of the flow of goods at one point in the global system need not require a wholesale reconfiguration of value chains; and flexibility, substitutability and agility in supply contracts and value chains to reduce exposure to shortfalls of certain goods.

The need to embed these core components of systemic resilience is increasingly recognized in mainstream debate; the *Financial Times* recently noted the following:

[E]ven companies that don't have suppliers or operations in the thick of the [Ukraine] conflict recognise they need to move from assumptions of unfettered globalisation to more regional — or even local — hubs of production and consumption. They also see the benefits of more decentralisation and system redundancy (namely having extra resources to provide back-up support) to avoid future shocks. "The ongoing supply chain disruptions have now lasted longer than the 1973-4 and 1979 oil embargoes — combined!" says Richard Bernstein, CEO of RBA, the investment firm. This isn't a blip, but rather the new normal.¹⁵⁹

Prioritizing 'no-regrets' response measures

The energy and food sectors are those with the greatest contribution – and exposure – to climate change. Both are, or should be, already in a period of rapid transition. There is an expectation that the risks from climate change and other environmental degradations will increasingly act as threat-multipliers in the decades ahead, with increased potential for cascading and systemic risk.¹⁶⁰ Decisions taken now must therefore aim not only to mitigate the immediate harms of the conflict, but also to build more resilient societies and economies for the long term.¹⁶¹

Possible response measures include policies to bring about changes to supply, demand and systems to accelerate broader market transitions. Among these measures are short-term interventions that would undermine the resilience of societies, such as those discussed above. Others may be regarded as 'no-regrets' options – measures that would ease immediate economic and social pressures while reducing vulnerability and exposure to supply and price shocks in the longer term, including actions to tackle climate change and environmental degradation. Table 1 below outlines possible 'no-regrets' policy measures, together with measures that could build resilience if well managed, and those that would contribute to system fragility and should be avoided.

¹⁵⁹ Foroohar, R. (2022), 'How war is changing business', *Financial Times*, 21 March 2022, <https://www.ft.com/content/742d7df6-0d74-424f-81c2-bcd4cbbdbfd0>.

¹⁶⁰ Challinor, A. and Benton, T. G. (2021), 'International dimensions', in Betts, R. A., Haward, A. B. and Pearson, K. V. (eds) (2021), *The Third UK Climate Change Risk Assessment Technical Report*, UK Climate Risk, <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA3-Chapter-7-FINAL.pdf>; Quiggin, D., De Meyer, K., Hubble-Rose, L. and Froggatt, A. (2021), *Climate change risk assessment 2021*, Research Paper, London: Royal Institute of International Affairs, <https://www.chathamhouse.org/2021/09/climate-change-risk-assessment-2021>.

¹⁶¹ Challinor and Benton (2021), 'International dimensions'; Quiggin, De Meyer, Hubble-Rose and Froggatt (2021), *Climate change risk assessment 2021*.

Supply changes

Current high energy prices have prompted the UK government to consider further investments in existing or new domestic oil and gas production – a move also being pursued in other countries, such as Brazil and Saudi Arabia.¹⁶² But, as discussed above, these approaches bring significant risks. In the energy sector, moves to diversify fossil fuel supply are risky, particularly in an already tight market: the EU has identified increasing LNG imports as a key short-term strategy to partially reduce dependency on Russian gas, but this has already had knock-on impacts on the global LNG market, pushing up the price of LNG and prompting Pakistan to reduce its LNG imports in favour of coal.¹⁶³

A wiser course of action for governments would be to move away from fossil fuels and invest in renewable energy, both in the energy sector and as an input in fertilizer and food value chains. As Isabel Schnabel, a member of the European Central Bank (ECB) executive board, said in March: ‘Every solar panel installed, every hydropower plant built and every wind turbine added to the grid are taking us a step closer to energy independence and a greener economy’.¹⁶⁴ While the implementation of new renewable energy capacity cannot be immediate, it is faster than construction of alternatives, such as nuclear power plants or new fossil fuel exploitation.¹⁶⁵ Accelerated deployment of renewable energy would also bring a host of co-benefits, including a rapid reduction in countries’ greenhouse gas emissions, more reliable and affordable energy supply in rural and vulnerable settings – for example, to agricultural producers in remote areas and to displaced communities and refugee settlements¹⁶⁶ – lower pollution and improved public health.

In the food sector, incentivizing agroecological approaches to farming would lessen dependence on energy-intensive synthetic fertilizers while mitigating the pollution of soil and water resources, and protecting vital ecosystems and biodiversity.¹⁶⁷ Diversifying production away from a reliance on major grains – through investment in alternative crops and through changes to food processing to utilize other ingredients – would increase flexibility and substitutability in global food markets, contribute to biodiversity conservation through the avoidance of large-scale monoculture, and build market resilience to climate impacts that threaten the future viability of major grains.¹⁶⁸

¹⁶² Bnamericas (2022), ‘Brazil could potentially strengthen its position in the geopolitics of oil’, 16 March 2022, <https://www.bnamericas.com/en/analysis/brazil-could-potentially-strengthen-its-position-in-the-geopolitics-of-oil>; BBC News (2022), ‘Saudi Aramco ramps up investment to boost production’, 20 March 2022, <https://www.bbc.co.uk/news/business-60812330>.

¹⁶³ Mangi, F. and Stapczynski, S. (2022), ‘Pakistan’s Energy Crunch Spurs ‘Barter’ Trade for Afghani Coal’, Bloomberg, 28 March 2022, <https://www.bloomberg.com/news/articles/2022-03-28/pakistan-s-energy-crunch-spurs-barter-trade-for-afghani-coal>.

¹⁶⁴ Schnabel, I. (2022), ‘A new age of energy inflation: climateflation, fossilflation and greenflation’, speech, European Central Bank, 17 March 2022, https://www.ecb.europa.eu/press/key/date/2022/html/ecb.sp220317_2~d8b3582f0a.en.html.

¹⁶⁵ EDF (undated), ‘All you need to know about wind power’, EDF energy, <https://www.edfenergy.com/home/energywise/all-you-need-to-know-about-wind-power#:~:text=Wind%20farms%20can%20be%20built,energy%20is%20only%206%20months!>

¹⁶⁶ Grafham (ed.) (2021), *Energy Access and Forced Migration*; Lahn and Grafham (2015), *Heat, light and power for refugees*.

¹⁶⁷ Poux, X. and Aubert, P.-M. (2018), *Ten Years for Agroecology in Europe: a multifunctional agriculture for healthy eating*, Paris: IDDRI, p. 73, <https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Iddri/Etude/201809-ST0918EN-tyfa.pdf>.

¹⁶⁸ GloPan (2020), *Future Food Systems: For people, our planet, and prosperity*, Foresight 2.0 report, <http://www.glopan.org/foresight2>.

Demand changes

A second set of ‘no-regrets’ policy options should aim to reduce overall demand for energy and crops. Some degree of demand change is likely to result from the current crisis if prices remain high: the IEA has lowered its forecast for global oil demand in 2022 by 950,000 barrels a day.¹⁶⁹ Certain changes in consumer behaviour may become permanent – for example, if households benefit from reduced bills that come from turning down their home heating, or if high oil prices prompt the purchasing of electric vehicles. But in many other cases, demand will return as and when prices drop.

Tackling wasteful consumption is a critical component of the transition to more sustainable and resilient economies in both the energy and food sectors. In the energy sector, energy efficiency measures in buildings to reduce the loss of heat – for example, through insulation, and public engagement to encourage home temperatures to be set slightly lower – can decrease both household costs and sectoral emissions.¹⁷⁰ Similarly in the food sector, policy- and industry-led changes to disincentivize food waste can bring large cost savings while mitigating an important source of emissions.¹⁷¹ Above all, interventions to encourage healthier and more sustainable diets through reduced consumption of meat – the production of which often depends on high volumes of grain for feed – and of highly processed foods – which have a common base of staple grains but which provide low nutritional value – can reduce overall demand for crops while contributing to lower sectoral emissions, more biodiverse food systems and improved public health.¹⁷²

Alongside curbing overall demand, adequate social safety nets will be critical to mitigate the worst harms on vulnerable households from future shocks. The long-term outlook is one of continued high energy and food prices: with Russia responsible for 7.8 million barrels per day of oil exports,¹⁷³ and in the absence of further fuel switching or increases in production, the market will remain undersupplied and consequently higher prices will continue.¹⁷⁴ With climate impacts on harvests expected to become more frequent and more severe in the coming years, food price spikes look set to be the new normal.¹⁷⁵

¹⁶⁹ IEA (2022), *Oil market report – March 2022*, International Energy Agency, <https://www.iea.org/reports/oil-market-report-march-2022>.

¹⁷⁰ European Commission (2022), ‘REPowerEU: Joint European action for more affordable, secure and sustainable energy’.

¹⁷¹ Hanson, C. and Mitchell, P. (2017), *The Business Case for Reducing Food Loss and Waste*, Champions 12.3, March 2017, <https://champions123.org/publication/business-case-reducing-food-loss-and-waste>; Intergovernmental Panel on Climate Change (2019), ‘Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems’.

¹⁷² Benton, T. G., Bieg, C., Harwatt, H., Pudasaini, R. and Wellesley, L. (2021), *Food system impacts on biodiversity loss: Three levers for food system transformation in support of nature*, Research Paper, London: Royal Institute of International Affairs, https://www.chathamhouse.org/sites/default/files/2021-02/2021-02-03-food-system-biodiversity-loss-benton-et-al_0.pdf; Willett et al. (2019), ‘Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems’.

¹⁷³ IEA (2022), ‘Oil Market and Russian Supply’, <https://www.iea.org/reports/russian-supplies-to-global-energy-markets/oil-market-and-russian-supply-2>.

¹⁷⁴ IEA (2022), ‘A 10-Point Plan to Cut Oil Use’, <https://www.iea.org/reports/a-10-point-plan-to-cut-oil-use>.

¹⁷⁵ Challinor and Benton (2021), ‘International dimensions’.

System changes

The third set of ‘no-regrets’ measures aims to mitigate market volatility through structural system changes. In the energy sector, system changes should include greater energy storage options. Gas storage is particularly important as demand is so seasonal. This is why the EU is introducing new legislation requiring all member states’ storage infrastructure to be 80 per cent full by the start of winter 2022. As important is greater electricity storage to enable grid stability and continuity of supply as the use of variable renewables such as solar and wind increases. Further system changes include the introduction of smarter grids, greater demand management and load-shifting, and the further reform of the electricity market, as well as the expansion of electric vehicle networks and renewable energy-powered public transport systems to facilitate the move away from fossil fuel-powered vehicles, lower living costs for households and reduced pollution in urban settings.

Gas storage is particularly important as demand is so seasonal. This is why the EU is introducing new legislation requiring all member states’ storage infrastructure to be 80 per cent full by the start of winter 2022.

In the food sector, a crucial ‘no-regrets’ system change is multilateral cooperation to improve transparency on fundamental market conditions. This would reduce market uncertainties and avoid counterproductive policy responses such as export restrictions and inflating inventories, which fuel negative sentiment and further imperil market stability. AMIS, a G20 initiative established in the wake of the 2007–08 and 2010–11 food price crises, plays an important role in promoting staple crop-market transparency and policy coordination.¹⁷⁶ However, difficulties in accessing information on prices and private-sector stocks, and opacity around Chinese inventories (which, owing to China’s large role in international markets, can be destabilizing if Chinese demand differs significantly from levels expected by other market actors), risk contributing to market uncertainty.¹⁷⁷ Clearer and stronger provisions under the WTO on agricultural export restrictions would also serve to reduce the likelihood of ad hoc measures and their impact on global markets, as would stronger governance of financial speculation in food markets. Following the food price spikes of 10–15 years ago, significant worries surfaced about the role that such speculation plays in amplifying food crises,¹⁷⁸

¹⁷⁶ OECD (2020), *The role of transparency in avoiding a COVID-19 induced food crisis*, OECD Policy Response to Coronavirus (COVID-19), 21 September 2020, <https://www.oecd.org/coronavirus/policy-responses/the-role-of-transparency-in-avoiding-a-covid-19-induced-food-crisis-d6a37aeb>.

¹⁷⁷ Gilbertie, S. (2020), ‘Does China Really Have 63% of World Corn Inventories? Probably Not.’, *Forbes*, 27 October 2020, <https://www.forbes.com/sites/salgilbertie/2020/10/27/does-china-really-have-63-of-world-corn-inventories-probably-not/?sh=137ec1f22a0b>; European Commission (2020), ‘Market Transparency’, https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/market-measures/agri-food-supply-chain/market-transparency_en.

¹⁷⁸ Field, S. (2016), ‘The financialization of food and the 2008-2011 food price spikes’, *Environment and Planning A: Economy and Space*, 40(11), pp. 2272–2290, <https://journals.sagepub.com/doi/10.1177/0308518X16658476>.

leading to calls for the G20 to strengthen its regulation.¹⁷⁹ Instead, the G20 focused on market transparency (through the creation of AMIS) and regulatory frameworks remain weak.¹⁸⁰

Strategic grain reserves are a costly option for governments – operational costs of maintaining adequate storage infrastructure can be high, and the value of the reserves is subject to market volatility – but are critical to ensuring sufficient resources in case of a major supply disruption.¹⁸¹ They can also provide a buffer in times of rapidly rising prices, buying governments some time to source supply from international markets at the best available price. For low-income, food-deficit countries, common strategic reserves and emergency sharing arrangements at a regional level – if well managed and governed transparently – could reduce vulnerability to future shocks.¹⁸² An alternative to physical stores of grain would be to develop mechanisms to channel grain from other uses (e.g. bioethanol production) at times when grain is needed for human consumption, such as through flexible biofuel mandates.¹⁸³

Table 1. Policy options to mitigate the impact of the Ukraine conflict on food and energy markets

Energy	Food
Supply changes	
Accelerate deployment of renewable energy.	Diversify agriculture to reduce global reliance on major grains.
Maximize outputs from existing low-emissions power sources (e.g. nuclear) to boost supply.	Incentivize agroecological farming approaches to reduce reliance on energy-intensive synthetic fertilizers.
Increase output of existing coal plants to boost supply.	Diversify trade relationships to reduce dependence on major producing regions.
Diversify gas imports away from Russia to reduce exposure to the conflict and its geopolitical and economic impacts.	Diversify food production and processing value chains to reduce dependence on major grains.
Drill for new fossil fuel reserves to increase supply.	Expand the area of agricultural production to increase supply.

¹⁷⁹ Jones, H. (2011), 'G20 too divided to back tough curbs on speculators', Reuters, 14 February 2011, <https://www.reuters.com/article/us-g20-commodities-idUSLDE7191T820110214>.

¹⁸⁰ Chadwick, A. (2017), 'Regulating Excessive Speculation: Commodity Derivatives and the Global Food Crisis', *International & Comparative Law Quarterly*, 66(3), pp. 625–55, <https://doi.org/10.1017/S0020589317000136>.

¹⁸¹ Bailey, R. et al. (2015), *Extreme weather and food system resilience*, synthesis report, UK Global Food Security Programme, <https://www.foodsecurity.ac.uk/publications/extreme-weather-resilience-global-food-system.pdf>.

¹⁸² Bailey and Wellesley (2017), *Chokepoints and Vulnerabilities in Global Food Trade*.

¹⁸³ Durham, C., Davies, G. and Bhattacharyya, T. (2012), *Can biofuels policy work for food security?*, discussion paper, London: Department for Environment, Food & Rural Affairs, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69565/pb13786-biofuels-food-security-120622.pdf.

Energy	Food
Demand changes	
Engage the public on sustainable energy-use behaviours to reduce overall demand.	Incentivize more sustainable diets, including reduced meat consumption, to decrease dependence on global grains.
Accelerate the deployment of energy efficiency measures in buildings to reduce energy losses.	Reduce food waste to boost supply of nutritious foods.
Build social safety nets to protect the vulnerable from price spikes.	Build social safety nets to protect the vulnerable from price spikes.
System changes	
Introduce minimum gas storage requirements to mitigate future shortfalls.	Establish common strategic reserves and sharing arrangements in food-deficit regions to mitigate future shortfalls.
Accelerate conversion of heating systems to heat pumps to enable fuel switching at the household level.	Clarify and strengthen WTO rules on market-distorting trade restrictions to reduce pressure on global prices.
Incentivize active transport and public transport fuelled by renewable energy to facilitate the move away from personal vehicles.	Strengthen overall transparency of food markets to reduce uncertainty and discourage protectionism.
Accelerate electricity storage to tackle supply–demand imbalances.	Strengthen speculation controls to avoid further amplification of price rises.

Source: Compiled by the authors from multiple sources, including IEA (2022), 'A 10-Point Plan to Cut Oil Use', <https://www.iea.org/reports/a-10-point-plan-to-cut-oil-use>; plus others cited elsewhere.

Note: Entries in green are 'no-regrets' options; those in amber can contribute to increased resilience if well managed; and those in red are high-risk options to be avoided.

Navigating a new geopolitical landscape

There has been an unprecedented political response to the invasion of Ukraine. To a greater or lesser extent, much of the world has disengaged from Russia and seeks to isolate the country from the global economy. The mass walk-out by over 100 diplomats during the Russian foreign minister Sergei Lavrov's speech at the UN General Assembly was a powerful illustration of Russia's ostracization by the international community.¹⁸⁴

Not all nations have condemned Putin's actions outright or imposed sanctions against Russia, however – some countries, notably China, appear to be more aligned with him. Russia holds a permanent seat on the UN Security Council, affording it veto rights over any vote or UN sanctions. Consequently, efforts by other permanent members to adopt a draft resolution calling for Russia's immediate withdrawal from Ukraine have been blocked. A similar resolution

¹⁸⁴ Aljazeera (2022), 'Dozens of diplomats walk out on Russian foreign minister's speech', 2 March 2022, <https://www.aljazeera.com/news/2022/3/2/dozens-of-diplomats-walk-out-on-lavrovs-un-speech>.

was passed by the UN General Assembly, despite Belarus, Eritrea, North Korea and Syria voting against; 35 others – including China and India – abstained.¹⁸⁵

One of the thorniest issues for the future of multilateralism is how the G20 functions under the Indonesian presidency. Calls from some members, such as Australia, for Russia to be expelled from the G20 are unlikely to be met.

This disparity in political stances towards Russia is likely to have a long-term geopolitical impact and will influence how European nations adjust their resource strategies to improve resilience. Even in the event of a ceasefire, it is highly unlikely that economic measures introduced in the energy sector will be unwound in the short to medium term, even in the event of an imminent ceasefire in Ukraine. Instead, these measures suggest a structural shift in global energy markets: first, with agreements between Western producers and consumers being quickly struck as a means of reducing Russian oil and gas imports (for example, the US commitment to supplying additional LNG to the EU over the period to 2030); and second, with Russia's pivot to Asia accelerating, and the longer-term implications for the transparency and governance of oil and gas markets. In addition to developing energy strategies that are less dependent on oil and gas from authoritarian states, some governments are also likely to move away from 'unfettered globalization' to regional and local supply chains and production of food.

One of the thorniest issues for the future of multilateralism is how the G20 functions under the Indonesian presidency. Calls from some members, such as Australia, for Russia to be expelled from the G20 are unlikely to be met. Nevertheless, it is hard to imagine that all 20 countries will be represented when the group meets in Bali in October 2022,¹⁸⁶ and in early April the US stated that it would boycott some G20 meetings if Russia is represented.¹⁸⁷ A series of ministerial meetings in the run-up to the summit – including on agriculture and energy transition in September, and on the environment and climate in August – will offer an earlier test of how members intend to engage with the summit.

Given the political fractures within the G20, the G7 – and its German presidency – is likely to focus its attention on the conflict in Ukraine, and on the ripple effects on resource pricing and the global economy. A joint statement from the G7 foreign ministers on 4 March 2022 reiterated the group's 'profound condemnation of Russia's unprovoked and unjustifiable war of choice against Ukraine', while

¹⁸⁵ Pamuk, H. and Landay, J. (2022), 'U.N. General Assembly in historic vote denounces Russia over Ukraine invasion', Reuters, 3 March 2022, <https://www.reuters.com/world/un-general-assembly-set-censure-russia-over-ukraine-invasion-2022-03-02>.

¹⁸⁶ Stockings, T. (2022), 'Russia's place in G20 club in question after Ukraine invasion', *The National News*, 2 March 2022, <https://www.thenationalnews.com/world/europe/2022/03/02/russias-place-in-g20-club-in-question-after-ukraine-invasion>.

¹⁸⁷ Reuters (2022), 'Yellen says Russia should be expelled from G20, U.S. may boycott some meetings', 7 April 2022, <https://www.reuters.com/world/yellen-says-russia-should-be-expelled-g20-us-may-boycott-some-meetings-2022-04-06>.

a statement from an extraordinary meeting of G7 agriculture ministers on 11 March expressed deep concern over the implications of the conflict for food security worldwide, noting the importance of Ukraine to global supply chains.¹⁸⁸

A joint statement from the heads of the European Bank for Reconstruction and Development, European Investment Bank, Council of Europe Development Bank, the International Monetary Fund (IMF) and the World Bank stated that ‘the entire global economy will feel the effects of the crisis through slower growth, trade disruptions, and steeper inflation, harming especially the poorest and most vulnerable’, and outlined emergency support packages in Ukraine and its neighbouring countries totalling over \$8.9 billion.¹⁸⁹ At the 2022 Spring Meetings, the IMF and World Bank are likely to concentrate efforts on keeping the wheels turning as they did through the COVID-19 pandemic, enhancing liquidity, financing working capital and expanding trade finance.

For Russia, signs of a fragmented Europe and weakening US influence will undoubtedly have been factored into the decision to invade Ukraine. Early responses from governments around the world indicate that the conflict in Ukraine, while posing challenges to the future agenda of the UN, G7 and G20 and increasing interest in resource independence, will also afford a renewed sense of urgency and commitment to multilateralism in the face of a common adversary. What remains to be seen is whether new blocs will emerge, aligned either with the Euro-Atlantic community or with Russia.

Conclusions

Food and energy are the lifeblood of any society, and their continued availability and affordability is essential. Over time, many countries and regions have become more reliant on imported resources as demand has increased and, in some cases, as domestic production has declined, either for economic reasons or due to depleted resources. Other countries have become significant global suppliers – and, consequently, global price setters. This is the case for Russia and Ukraine: Russia, as a supplier of natural gas to Europe and of fertilizer to international markets; and both countries as suppliers of grain and oilseeds.

Before Russia’s invasion of Ukraine, and as global economies recovered from the consequences of the COVID-19 pandemic, markets were already tightening, with supply struggling to keep up with rising demand. Climate change was threatening yields in a number of key producing regions and increasing food price volatility. High energy prices were spilling over into food markets by driving up the price of fertilizer. Societies in all parts of the world were facing a cost-of-living crisis.

To this existing state of vulnerability, the conflict in Ukraine and its impacts on energy and food markets have added both direct threats – high energy and food prices and the prospect of reduced supply – and cascading risks, with

¹⁸⁸ G7 Germany (2022), ‘Overview of the G7 documents’, <https://www.g7germany.de/g7-en/g7-documents>.

¹⁸⁹ World Bank (2022), ‘Joint Statement of Heads of International Financial Institutions with programs in Ukraine and neighboring countries’, 17 March 2022, <https://www.worldbank.org/en/news/statement/2022/03/17/joint-statement-of-heads-of-international-financial-institutions-with-programs-in-ukraine-and-neighboring-countries>.

the potential for resource market impacts to ripple out and deepen economic insecurity. The current situation has thrown light on the interconnectedness of crises in a globalized world. It highlights the importance of addressing disruptions to markets and supply chains not in isolation but as interrelated systemic risks.

Already, the scale of price rises will have significant global impacts. Governments will need to intervene to support the most vulnerable in their own countries and, where possible, internationally to help rebalance supply and demand. Decisions taken now will be formative in either entrenching existing structures or setting countries around the world on a path towards more resilient economies. Short-term measures to reduce exposure to international markets and to boost resource ‘independence’ – at the expense of the energy transition and sustainable reform – risk heightening the vulnerability of societies and economies in the longer term.

While the circumstances of the current crisis are extraordinary, the direct impacts and cascading risks to which it contributed – high resource prices, supply-chain disruptions, market volatility, economic conflict, energy and food insecurity, displacement and migration, and geopolitical uncertainty – are likely to be the new normal in a climate-changed world. Building long-term resilience to shocks of this scale is not an optional extra for governments as they respond to the fallout from the conflict in Ukraine, but an urgent necessity.

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The views and conclusions formed and outlined in the paper are the responsibility of the authors.

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Cover image: Livestock farmers work on a bombed farm outside Kharkiv, Ukraine, 2 April 2022.

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