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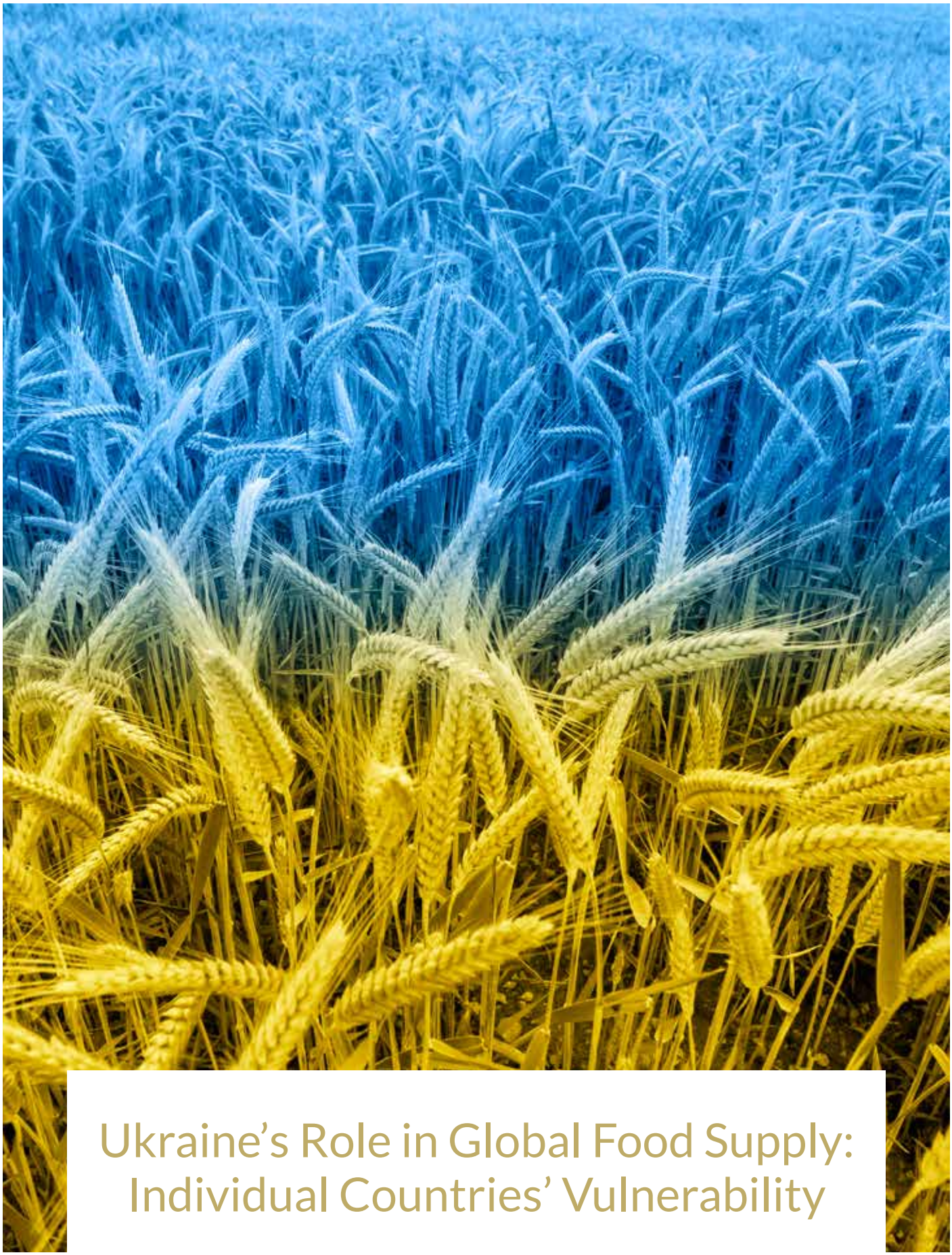

Ukraine's Role in Global Food Supply: Individual Countries' Vulnerability

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Veronika Movchan

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About the author

Veronika Movchan is the Academic Director of the *Institute for Economic Research and Policy Consulting (IER)* in Ukraine. Her main research interests are in the sphere of trade policy, including WTO and EU related issues, regional integration, non-tariff measures, quantification of trade policy instruments, and modelling of (economic) policy changes.

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Foreword The other aspect of Russia's war: a global food crisis

This report, **Ukraine's Role in Global Food Supply: Individual Countries' Vulnerability**, deals with a challenge Russia's war of aggression in and against Ukraine has engendered on top of the dire consequences for its victim: After four months the war is threatening the ability of some countries in the world to feed themselves.

Over the past two decades, Ukraine had become a global supplier of primary agriculture and food commodities, such as cereals and sunflower-seed oil.

Now, logistics are heavily disrupted, with exports of grain and other agricultural commodities considerably reduced as a result. The forthcoming 2022/23 harvest is also at risk as an estimated 30 per cent drop in land under seeded cultivation is expected.

Moreover, the Russian Federation is deliberately seeking to fan global food insecurity: e.g., on the one hand exacerbating scarcity, and on the other hand suggesting that its own exports could be augmented if opponents rolled back or entirely suspended their sanctions.

This analysis is part of the Bertelsmann Stiftung's project **Sovereign Europe: Strategic Management of Global Interdependence**, with which we seek to raise geopolitical awareness in the EU of the challenges presented by critical economic interdependencies in the face of ever-increasing systemic rivalry with autocracies such as Russia and China. We also aim to review policies and instruments that could contribute to the EU's goal of open strategic autonomy.

With the global food crisis coming to a head with every additional day, it is crucial to ensure accurate analysis of the evolving conditions of food security and to provide a baseline for further strategy planning, long- and short-term.

This is what our analysis is designed to achieve. By identifying and quantifying risks, we want to provide policymakers with the impetus to work on concrete solutions, strengthen resilience in the most affected countries and defuse potential crises within them before it all evolves into acute conflicts.

We welcome the action plan for EU-Ukraine Solidarity Lanes to facilitate Ukraine's grain exports hindered by occupied harbours and sea blockades. However, rail and road transport alone will not help to significantly increase exports. To reroute millions of tons of grain is a daunting logistical challenge. In peacetime, Ukraine handled about 50% of its imports and exports, including grains, through its largest Black Sea port Odessa alone, which is both a transportation hub and an economic lifeline.

At any rate, the recent initiative to improve EU-Ukraine connectivity for grain export should be read in conjunction with a previous Bertelsmann Stiftung study on Geopolitical Ambitions in the Black Sea and Caspian Region. Reforms of Ukraine's transport sector are mooted therein, including specific recommendations for strategically improving and securing infrastructure, transport corridors and waterways in the EU neighbourhood.

As early as June 2020, Bertelsmann Stiftung said such reforms were vital for Ukraine's export-orientated industries, including agriculture, and suggested they figure highly on the bilateral EU-Ukraine reform agenda. This holds for the recommendation that the EU should attach explicit conditionality and link its assistance in ameliorating and upgrading Ukraine's infrastructure to concrete steps taken by Kyiv towards transparency and sustainability – and monitoring these steps in close cooperation with Ukraine's civil society and expert community.

The same recommendations apply to economic cooperation during the reconstruction phase. Only if accompanied by sound policies that do not gloss over challenges but meet them with resilience, will economic cooperation remain an important building block in shared efforts and policies to create a peaceful and more prosperous Ukraine.

1. Introduction

The role of Ukraine in the global supply of agriculture and food products can scarcely be underestimated as the country has been among the top exporters of cereals, oilseeds and vegetable oils and is a growing global supplier of poultry.

The full-scale Russian invasion of Ukraine on February 24, 2022 disrupted Ukraine's exports, as military action, including sustained bombardments, brought about severe logistical damage and bottlenecks. The logistical disruption includes the blockade of Black Sea ports – the key shipping route for Ukraine's grain exports. On top of the murky export outlook due to logistical constraints, the prospects for the 2022/2023 harvesting campaign are far from clear. While Ukraine has enough grain domestically, export disruptions have already resulted in growing food prices and shortages globally, and the situation may deteriorate even further depending on this year's world harvest.

This research paper is aimed at understanding which countries depend on Ukraine's supplies of crucial agriculture and food products and how far they do so individually in order to identify the most vulnerable.

The study is based on analysing trade data and the food balances of countries importing Ukraine's agriculture and food products. The research focuses on the essential products exported by Ukraine: wheat, maize, barley, sunflower-seed oil, poultry, and soybeans. We aim to answer two questions for each product and country: how vulnerable the domestic market is to the supply shock (domestic market vulnerability) and how large the supply gap is compared to other countries (global vulnerability).

The paper is organised as follows: Section 2 reviews the role of Ukraine global agriculture and food trade before the war and the situation in the sector as of May 2022. Section 3 is devoted to assessing importing countries' dependencies on individual products. Section 4 summarises the vulnerabilities of each country, and Section 5 concludes with policy recommendations and action items.

2. The role of Ukraine in global agri-food trade and the impact of the war on its exports

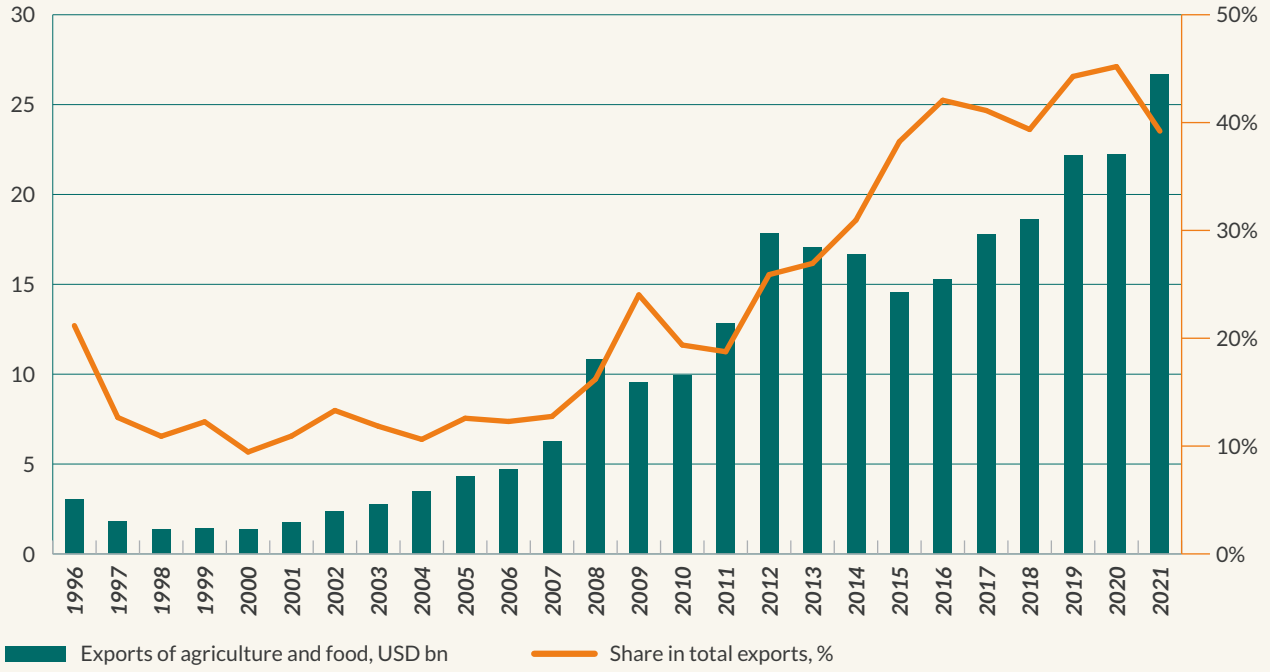
Ukraine's agriculture and food exports have grown steadily since the 2000s, alongside improved productivity after the government dissolved the collective farms and introduced private ownership of agricultural land.

According to Ukrstat, the State Statistics Service of Ukraine,[1] in 2021 the average yield of cereal and leguminous crops was 5.4 tons per hectare (ha) of the harvested area, or more than double what it was upon independence in 1991. The yields for other major agricultural products increased on a similar scale: twofold for sugar beetroots between 1991 and 2021, about 1.7x for sunflower seeds, potatoes and vegetables. The fivefold growth in the yield for fruits and berries has been most impressive.

In 2021, Ukraine's agriculture and food exports reached USD 27bn, a post-independence peak. The 2021/2022 harvest also reached a record high at 86 million (m) tons for cereal and leguminous crops and 16m tons for sunflower seeds, promising another bumper year for exports.

1 This is the government agency responsible for collection and dissemination of statistics in Ukraine. The official website is www.ukrstat.gov.ua.

FIGURE 1 **Ukraine's exports of agriculture and food products, 1996–2021**



Source: UN ComTrade, own estimates; agriculture and food are defined as HS 01–24 | **© Bertelsmann Stiftung**

FIGURE 2 **Ukraine's role in the global export of primary agriculture and food products**

Sources: ITC Trade Map, own estimates based on trade data by individual countries, base year: 2020 | **© Bertelsmann Stiftung**

The success of Ukraine's agriculture has translated into its prominent place as a global food exporter.

In 2020, Ukraine was the second-largest exporter of cereals among individual countries, preceded only by the USA. Between 2016 and 2020, Ukraine increased its share of global cereal exports from 6.3% to 7.9%, notably overtaking Argentina. Ukraine's strength in exports of cereals is based on its diversity, as it is a leading supplier of wheat, maize and barley. For instance, Ukraine is the fifth largest wheat exporter, accounting for 8% of global wheat exports in 2020, while being the fourth largest exporter of barley and maize.

Moreover, the country is the largest global exporter of sunflower seed, safflower or cottonseed oil and fractions thereof (HS[2] 1512), accounting for almost 40% of total exports. Ukraine's share of global exports of crude sunflower oil (HS 151211) ranges from 48 to 53%. Thanks to this sunflower seed oil, Ukraine became the third-largest exporter of fats and vegetable oils globally, gradually increasing its share to 5.6% in 2020.

Ukraine is also a significant exporter of oilseeds, accounting for ca. 2% of global exports in 2016–2020. The country is ranked ninth global exporter, recently overtaking India. In this category, the most critical component of Ukraine's exports is soybean (seventh in the world in 2020). Its share of exports remains within the 1–2% range. However, Ukraine produces GMO-free soybeans, unlike Brazil and the USA, which makes them attractive for soybean importers from Europe in particular.

Ukraine has meanwhile gradually emerged as an exporter of animal-derived products, exports of which are more difficult given the need to comply with more stringent food safety regulations. In 2020, it was the number ten global exporter of poultry, with its share doubling between 2016 and 2020.

The full-scale Russian aggression has resulted in significant export disruptions. Ukraine previously exported about 5–6m tons of grains per month, predominantly via its seaports. In March 2022, Ukraine's export volume of grains dropped to only 0.2m tons.[3] In April, the situation improved as Ukraine exported over 1.2m tons of grains and oilseeds, mainly via rail.[4]

2 The HS stands for a Harmonised System of tariff nomenclature, an international classification for traded products. The full name of the classification is a Harmonized Commodity Description and Coding System. The system is administered by the World Customs Organisation. The HS is organized into sections, chapters, headings and subheadings. Chapters have 2-digit numeric codes, headings – 4-digit numeric codes, and subheadings – 6-digit numeric codes.

3 As reported by Mykola Solsky, the Ministry of Agriculture of Ukraine, in interview to European Pravda, see https://www.epravda.com.ua/publications/2022/04/14/685728/.

4 See https://www.growhow.in.ua/u-kvitni-ukraina-eksportuvala-ponad-1-2-mln-tonn-zernovykh-ta-oliynykh/.

The country also used its ports on the Danube,[5] accessible by some sea-going ships. In May, Ukraine exported 1.74m tons of grains and oilseeds by all means of transport, 1.8 times more than in April – in a reorientation of export channels.[6] However, the capacity of the railways and the Danube taken together falls far below national needs.

The country still retains an estimated 20m tons of grains from the 2021/2022 harvest for exports. Resuming exports is also vital for Ukraine itself, as logistical bottlenecks have already resulted in a sharp drop in domestic grain prices, further hurting farmers' incomes. Moreover, the unshipped volumes held over from last year are filling storage space required for the forthcoming harvest. And this unshipped grain is threatened by shelling and deteriorating to the point where it could be lost.

The 2022/2023 harvest is expected to be significantly lower than last year because of military action and/or temporary occupation of territories, material degradation, particularly caused by mines, and shortages of labour, capital and key ingredients such as fertilizers. Both the harvested area and the yield are expected to decline.

According to US Department of Agriculture (USDA) assessments, Ukraine's wheat harvest in 2022 could be about 21.5m tons or as much as 11m tons less than in 2021.[7] The situation with maize, sown in spring, is even worse. In 2022, Ukraine is expected to harvest about 20m tons, half of the previous year's yield. That would mean a decline in the cereal and leguminous crops harvest of at least 30m tons compared to last year or down a third. However, even this amount remains uncertain as war damage may further undermine what Ukraine will be able to harvest.

The reduced harvest will also mean far lower exports as the country needs to cover its domestic needs first. The USDA projects that in the 2022/2023 marketing year Ukraine will have 10m tons of wheat and 9m tons of maize available for export, a fall of more than 200% on previous levels. Moreover, even this amount depends on adequate shipping capacity being available. These and future disruptions of agriculture supplies caused by Russia's full-scale military aggression have inevitably affected the entire global food supply chain. They immediately brought soaring global food prices and thus blighted access to food for the poorest people around the globe.

Below we investigate how vulnerable importing countries' domestic markets are to the disruptions in Ukrainian exports.

5 There are three Ukrainian ports on the Danube: Izmail, Reni and Ust-Danube.

6 See Ukraine Open for Business, June 6, 2022, UKRAINE EXPORTS 1.74 MLN TONNES OF GRAINS AND OILSEEDS IN MAY https://open4business.com.ua/ukraine-exports-1-74-mln-tonnes-of-grains-and-oilseeds-in-may.

7 See https://www.usda.gov/oce/commodity/wasde/wasde0522.pdf.

3. Vulnerability of importing countries

The analysis is based on trade data and the product balances of the countries importing from Ukraine. We focus on six essential products: wheat, maize, barley, sunflower seed oil, soybeans and poultry.

For each product and country, we identify the share of Ukraine's imports in a country's domestic product supply. It is estimated as the share of imports in domestic product supply[8] multiplied by the share of imports from Ukraine in that country's total imports. This information enables us to assess a country's potential **domestic market vulnerability** to the invasion shock. We rank the countries from least to most vulnerable for each product. The summary of the findings allows us to identify the countries facing the most severe shock.

Several qualifying remarks should be made. First, the analysed products are commodities; thus, imports from Ukraine can be substituted by imports from other countries or domestic production. However, substitution requires time and costs money. Moreover, the world's supply in toto is declining due to the invasion shock, affecting global prices and thus product affordability. Therefore, while countries with acute domestic market vulnerability to the invasion shock are not the only affected countries, they are on the 'frontline' of its impact.

Second, domestic market vulnerability covers the dependence of both intermediate and domestic final consumption on imports. In most cases, imported products are used for food or feed domestically so the supply shock harms food security in the importing country. However, imported products can also be processed and exported to third countries. In this case, the invasion shock affects the manufacturing or labour market, while the food security risks are passed on to countries consuming processed products.

8 Domestic product supply is defined as production plus imports minus exports. The change in stocks is not taken into account due to data limitations as the stocks variation is available for wider product categories only.

Differentiating between these two impacts is beyond the scope of this report.

For each country, we classify the degree of domestic market vulnerability to supply shock using the following scale:[9]

- Up to 1%: no vulnerability
- 1% to 5%: limited vulnerability
- 5% to 15%: medium vulnerability
- 15% to 35%: high vulnerability
- Over 35%: extreme vulnerability

We also analyse a country's **global vulnerability** to the invasion shock by measuring its share in global product trade that it used to source from Ukraine. It is calculated by multiplying the country's share of product imports from Ukraine by Ukraine's share (in percentage points) of global exports.[10] The higher the global vulnerability value, the higher a country's degree of dependence upon Ukraine's exports compared to other countries. It is assumed that it is more than likely harder to cover a larger shortfall. This measure allows a better understanding of how difficult it would be to cover the deficit and thus mitigate the shock. We do not offer an explicit scale to rank the countries. The aim of this measure is to serve as a supplementary assessment that assists us in classifying how difficult (or not) it will be to absorb a particular supply shock.

In all cases, the analysis is based on average values of imports and domestic supply for 2016–2020 to mitigate data volatility.[11]

9 This scale is purely indicative and should be handled with caution.

10 For instance, Ukraine's share in global wheat exports is 8% (92% are supplied by other countries). Out of these 8%-share of Ukraine, Indonesia buys 15% or 1.2% of global wheat imports. This latter value is Indonesia's global vulnerability to the invasion shock for wheat.

11 The supply and demand for agricultural products is sensitive to weather conditions, like frosts, heavy rains, droughts etc. that vary annually. To smoothen the variation generated by these factors, five-year average is applied.

Wheat

In the 2021/2022 marketing year, global wheat production reached 779m tons, of which about 200m tons were earmarked for foreign trade.[12] The main exporters are Russia, the USA, Canada, France, Ukraine, Australia and Argentina, taken together accounting for about two thirds of global exports (Table A1.2).

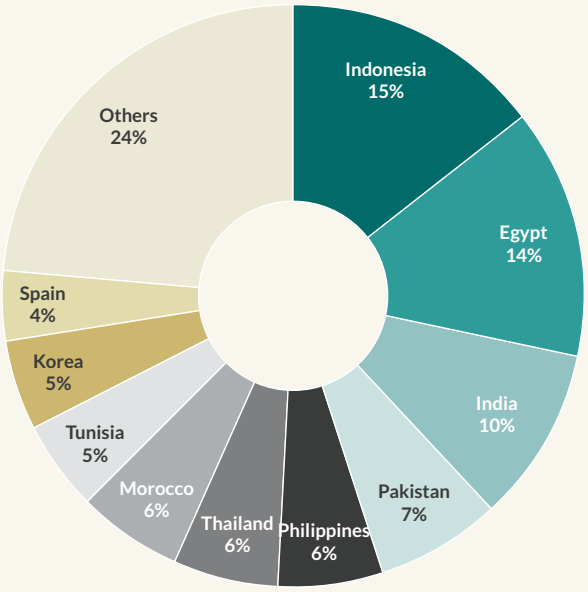
Ukraine's wheat harvest in 2021/2022 reached 33m tons, while the amounts to be set aside for domestic consumption were about 10m for food and 4m for feed. That would have left about 19m tons available for export had it not been for the war.

We analysed 86 countries importing wheat from Ukraine from 2016 to 2020. The largest importers were Indonesia, Egypt, India, Pakistan, and the Philippines, taken together accounting for over half of Ukrainian wheat exports.[13] NB: wheat exports

12 According to the World Agricultural Demand and Supply Estimates by the US Department of Agriculture, May 2022, see https://www.usda.gov/oce/commodity/wasde/wasde0522.pdf.

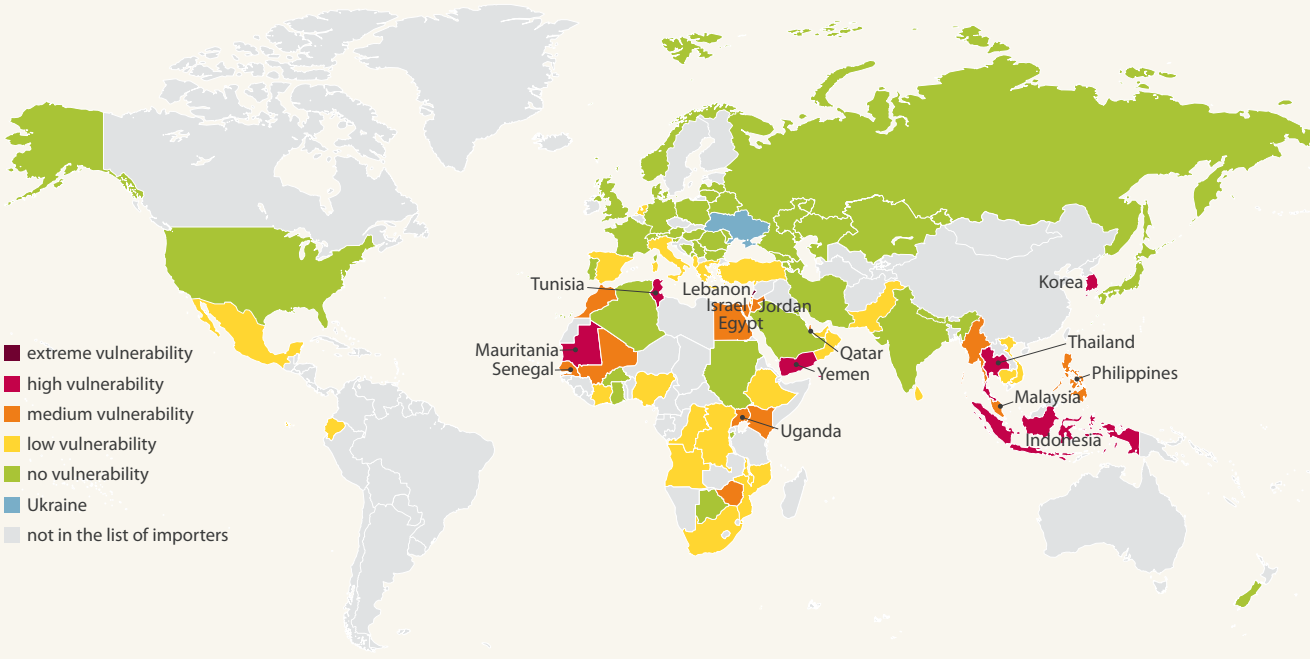
13 In the study, we use the sum of the partners' product imports from Ukraine as a measure of the Ukrainian product exports worldwide.

FIGURE 3 **Top countries importing wheat from Ukraine, 2016–2020 average**



Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 4 **Domestic market vulnerability: wheat**



Source: Own estimates | **© Bertelsmann Stiftung**

to the EU market have been held back by about one million tons only allowed to be supplied duty-free under a tariff-rate quota. The non-quota supplies have proven unattractive given the existing MFN duties[14] in the EU and high demand in other countries. The largest EU-27 importer of Ukrainian wheat was Spain. In May this year and foremost as a response to the war, the European Parliament endorsed a one-year suspension for all tariffs and quotas on Ukrainian exports, including agricultural products, processed agricultural products, and fruit and vegetables. According to calculations by the Ukrainian Business and Trade Association, an abolition of all quotas and tariffs by the EU could – in normal times – lead to the increase of Ukrainian exports to the EU by more than half a billion euros.[15]

As for domestic market vulnerability, Lebanon is the most exposed as Ukraine accounts for 47% of its domestic wheat supply (Table A2.1). There are six countries with a high level of vulnerability, namely Thailand, Mauritania, Tunisia, Indonesia, Korea, and Yemen. There are also thirteen countries with a medium level of vulnerability. These are Philippines, Israel, Uganda, Malaysia, Egypt, Jordan, Qatar, Senegal, Morocco, Kenya, Mali, Myanmar, and Zimbabwe.

Regionally, Asia and Africa are the most vulnerable.

The global vulnerability assessment adds additional insights. While Lebanon features the extreme vulnerability of its market, it requires only about 0.2% of global wheat imports to cover its shortfall. That translates into about 0.4m tons that could be potentially sourced from other suppliers.

At the same time, there are six countries with a high (15–35%) level of vulnerability, and Indonesia – the largest importer of wheat from Ukraine – is among them. Indonesia requires 1.2% of global wheat imports or at least 2.4m tons. The scale of this shortfall may well be more difficult to compensate in full.

TABLE 1 **The domestic market and global vulnerabilities of top 15 importing countries – wheat**

	Country	Domestic market vulnerability	Global vulnerability
1	Lebanon	extreme	0.2%
2	Thailand	high	0.5%
3	Mauritania	high	0.1%
4	Tunisia	high	0.4%
5	**Indonesia**	**high**	**1.2%**
6	Korea	high	0.4%
7	Yemen	high	0.2%
8	Philippines	medium	0.5%
9	Israel	medium	0.1%
10	Uganda	medium	0.04%
11	Malaysia	medium	0.1%
12	**Egypt**	**medium**	**1.1%**
13	Jordan	medium	0.1%
14	Qatar	medium	0.01%
15	Senegal	medium	0.04%

Source: WITS, FAO, own estimates. | **© Bertelsmann Stiftung**

14 MFN duty stands for most favoured nation duty. The MFN duty is a non-preferential duty applied by the EU in trade with all WTO members if no preferences are applicable. The use of import duties increases the price of goods for domestic consumers, making its less competitive on the market and thus hampering imports.

15 See https://www.euractiv.com/section/agriculture-food/news/meps-back-one-year-trade-liberalisation-with-ukraine/.

Barley

Global barley production is about 150m tons, of which about a quarter is traded worldwide.[16] The main exporters are France, Australia, Russia, Ukraine, Canada and Germany, taken together accounting for over two thirds of global exports (Table A1.3).

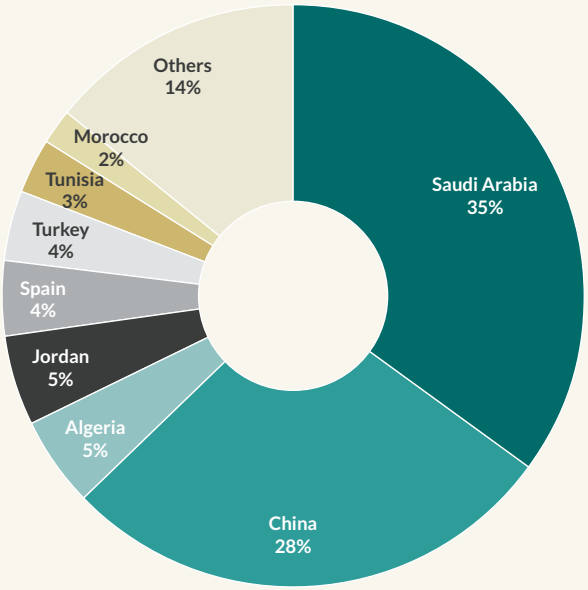
In the 2021/2022 marketing year, Ukraine harvested about 10m tons of barley, about half of which was expected to be shipped abroad.

We analysed 57 countries importing barley from Ukraine from 2016 to 2020. The largest importers were Saudi Arabia and China, together accounting for almost two-thirds of barley exports from Ukraine within the period.

We identified one country with extreme vulnerability. Sri Lanka gets 44% of its domestic market for barley from Ukraine (Table A2.2). There are five countries with high vulnerability, namely Qatar, Saudi Arabia, Cyprus, Lebanon, and Guyana. Ten more

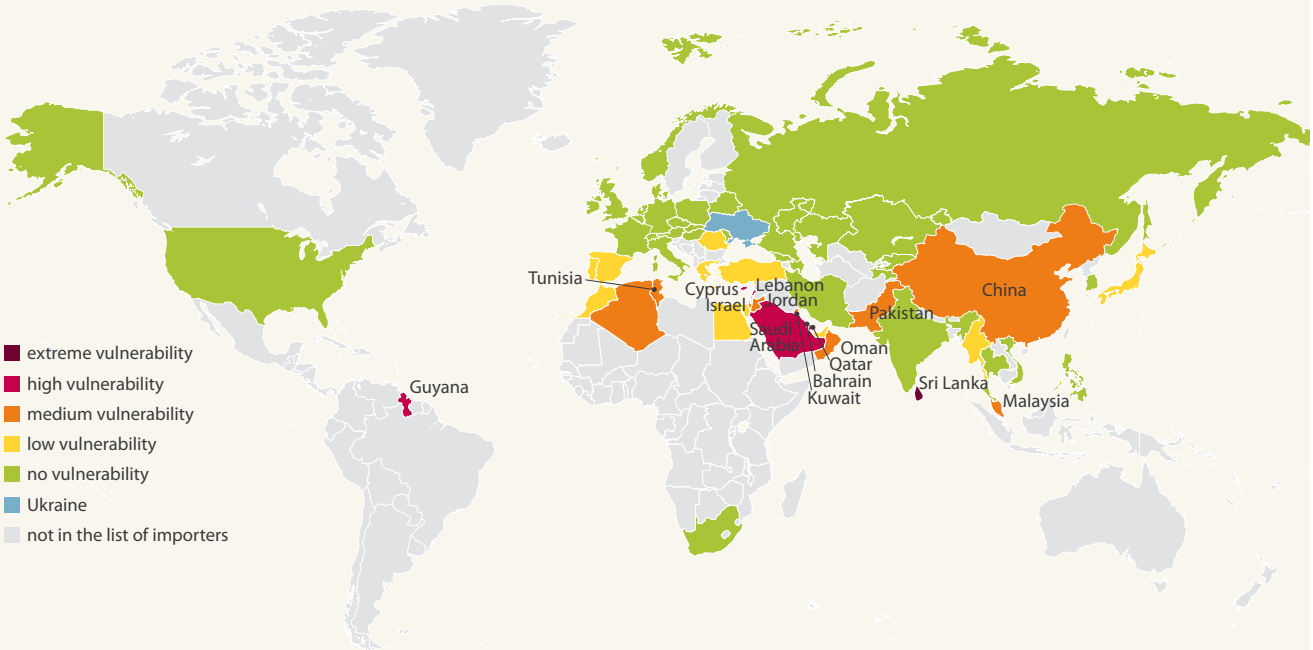
16 According to FAO, see https://www.fao.org/faostat/en/.

FIGURE 5 **Top countries importing barley from Ukraine, 2016–2020 average**



Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 6 **Domestic market vulnerability: barley**



Source: Own estimates | **© Bertelsmann Stiftung**

countries with medium vulnerability are Malaysia, Jordan, Israel, Oman, Bahrain, Pakistan, China, Tunisia, Kuwait, and Algeria.

Regionally, Asia is the most vulnerable.

Sri Lanka may have the greatest domestic vulnerability towards disruption in Ukraine's barley exports but does not figure among countries heading the global vulnerability list. It takes only about 0.01% of global barley imports or 2,000–3,000 tons to cover its needs.

It could be more challenging to find alternative suppliers for Saudi Arabia since it sources on average 4.2% of global barley imports or about 1.5m tons from Ukraine.

TABLE 2 **The domestic market and global vulnerabilities of top 15 importing countries – barley**

	Country	Domestic market vulnerability	Global vulnerability
1	Sri Lanka	extreme	0.01%
2	Qatar	high	0.1%
3	**Saudi Arabia**	**high**	**4.2%**
4	Cyprus	high	0.1%
5	Lebanon	high	0.1%
6	Guyana	high	0.0001%
7	Malaysia	medium	0.004%
8	Jordan	medium	0.5%
9	Israel	medium	0.2%
10	Oman	medium	0.1%
11	Bahrain	medium	0.001%
12	Pakistan	medium	0.03%
13	**China**	**medium**	**3.3%**
14	Tunisia	medium	0.4%
15	Kuwait	medium	0.1%

Source: WITS, FAO, own estimates. |

Maize

In the 2021/2022 marketing year, global maize production reached 1,216bn tons, of which less than 200m tons are earmarked for foreign trade.[17] The main exporters are the USA, Argentina, Brazil, Ukraine and France, taken together accounting for over three quarters of global exports (Table A1.4).

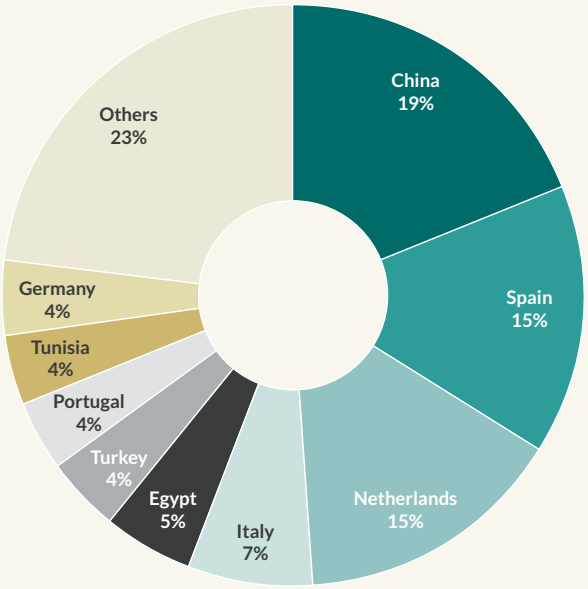
Ukraine's maize harvest in the 2021/2022 marketing year reached 40m tons,[18] of which about half has been designated for exports.

We analysed 82 countries importing maize from Ukraine from 2016 to 2020. The largest importers were China, Spain, and the Netherlands, jointly accounting for almost half of Ukraine's maize exports. Notably, the EU established a tariff-rate quota (TRQ) on imports of maize from Ukraine. However, as the MFN

17 According to the World Agricultural Demand and Supply Estimates by the US Department of Agriculture, May 2022, see https://www.usda.gov/oce/commodity/wasde/wasde0522.pdf.

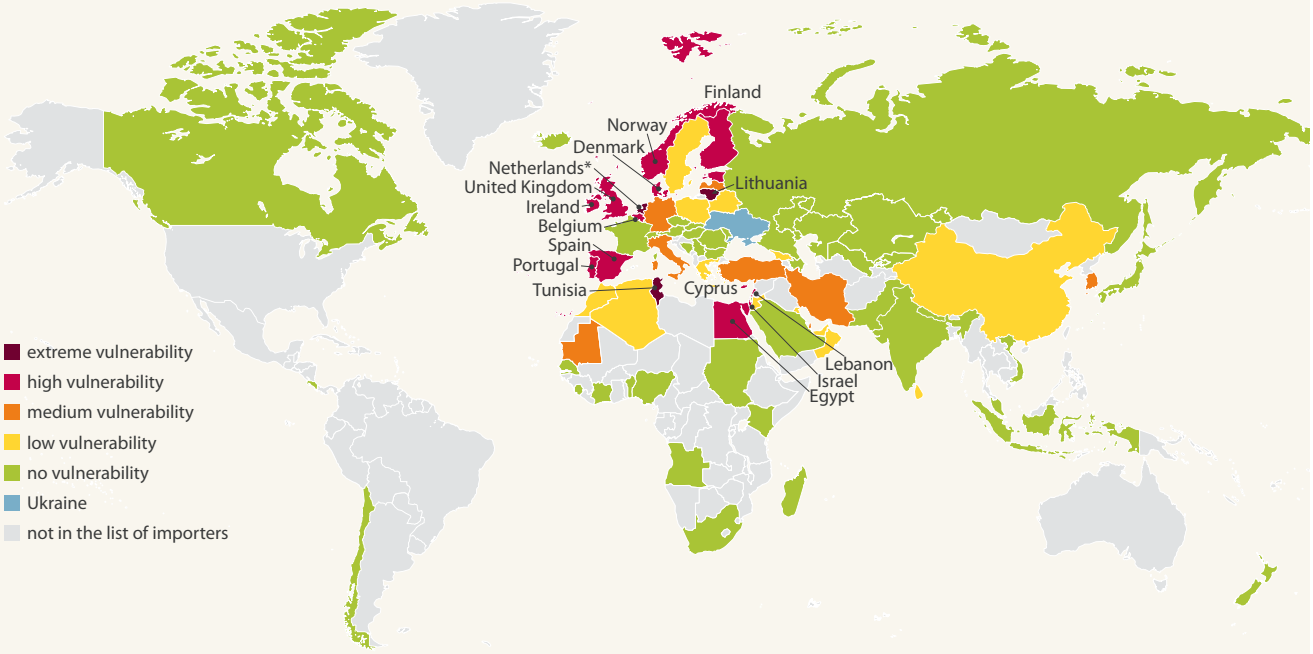
18 According to Ukrstat, http://ukrstat.gov.ua/operativ/operativ2021/sg/ovuzpsg/ovuzpsg_1221.xls.

FIGURE 7 **Top countries importing maize from Ukraine, 2016–2020 average**



Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 8 **Domestic market vulnerability: maize**



Note: *Result for the Netherlands might be biased as the Netherlands serves as a hub. | Source: Own estimates | **© Bertelsmann Stiftung**

import duty on maize tends to be equal to zero, the TRQ does not constitute a trade barrier on exports to the EU. That explains why, unlike in the aforementioned case of wheat, the EU is a large importer of Ukrainian maize.

When it comes to domestic market vulnerability, the exposure to Ukrainian exports of maize is higher than for wheat and barley. We identified three countries featuring an extreme level of vulnerability: Lithuania, Tunisia and the Netherlands. Lithuania and Tunisia source about two-thirds of their supply from Ukraine, while in the Netherlands[19] case it is 46% (Table A2.3).

There are a dozen countries with high vulnerability – Finland, Portugal, Ireland, Israel, Denmark, Spain, United Kingdom, Norway, Cyprus, Belgium, Lebanon, Egypt, and Estonia. Ten more have medium vulnerability.

Regionally, Europe and Africa are the most vulnerable.

Two of the three countries featuring extreme exposure to disruption do not head the global vulnerability list. In particular, Lithuania requires only about 0.1% of global maize imports or less than 0.2m tons to cover its needs. For Tunisia, the situation is more challenging as it requires 0.5% of global imports or 0.7m tons to compensate for the supply shock; even so, the shortfall is very moderate as a proportion of global trade volumes.

Data shows that the Netherlands is the most exposed among the countries with extreme vulnerability, requiring 2.0% of global imports or 3m tons to compensate for disruption. However, these figures should be treated with some caution as the Port of Rotterdam serves as an import hub for the EU, so import data more than likely overstate the country's vulnerability.

Among countries with high vulnerability, Spain is most exposed. Like the Netherlands, it needs 2.0% of global trade or 3m tons to compensate for disruption. An extra challenge is finding the GMO-free maize to comply with EU regulations.

TABLE 3 **The domestic market and global vulnerabilities of top 15 importing countries – maize**

	Country	Domestic market vulnerability	Global vulnerability
1	Lithuania	extreme	0.1%
2	Tunisia	extreme	0.5%
3	**Netherlands***	**extreme**	**2.0%**
4	Finland	high	0.005%
5	Portugal	high	0.6%
6	Ireland	high	0.2%
7	Israel	high	0.2%
8	Denmark	high	0.1%
9	**Spain**	**high**	**2.0%**
10	UK	high	0.4%
11	Norway	high	0.02%
12	Cyprus	high	0.03%
13	Belgium	high	0.3%
14	Lebanon	high	0.1%
15	Egypt	high	0.7%

Note: *Result might be biased as the Netherlands serves as a hub.
Source: WITS, FAO, own estimates. | **© Bertelsmann Stiftung**

19 The results for the Netherlands might be biased as the country serves as a hub for EU imports in general.

Sunflower-seed oil

Global production of sunflower-seed oil is about 20m tons, of which about three quarters are earmarked for foreign trade.[20] The main exporters are Ukraine, Russia, Turkey, the Netherlands and Hungary, taken together accounting for almost three-quarters of global exports (Table A1.6).

Ukraine manufactures between 5 and 6m tons per annum,[21] predominantly for exports.

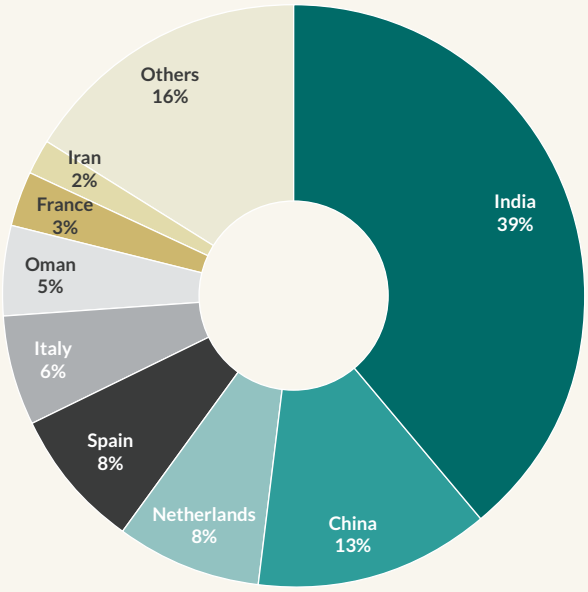
We analysed 126 countries importing sunflower-seed oil from Ukraine from 2016 to 2020. The largest importers were India and China, jointly accounting for over half of Ukraine's sunflower-seed oil exports within the period.

Given the pre-eminent role of Ukraine in sunflower oil exports globally, exposure to war-induced export disruptions is here at its most acute among all the products analysed within this paper.

20 According to FAO, see https://www.fao.org/faostat/en/.

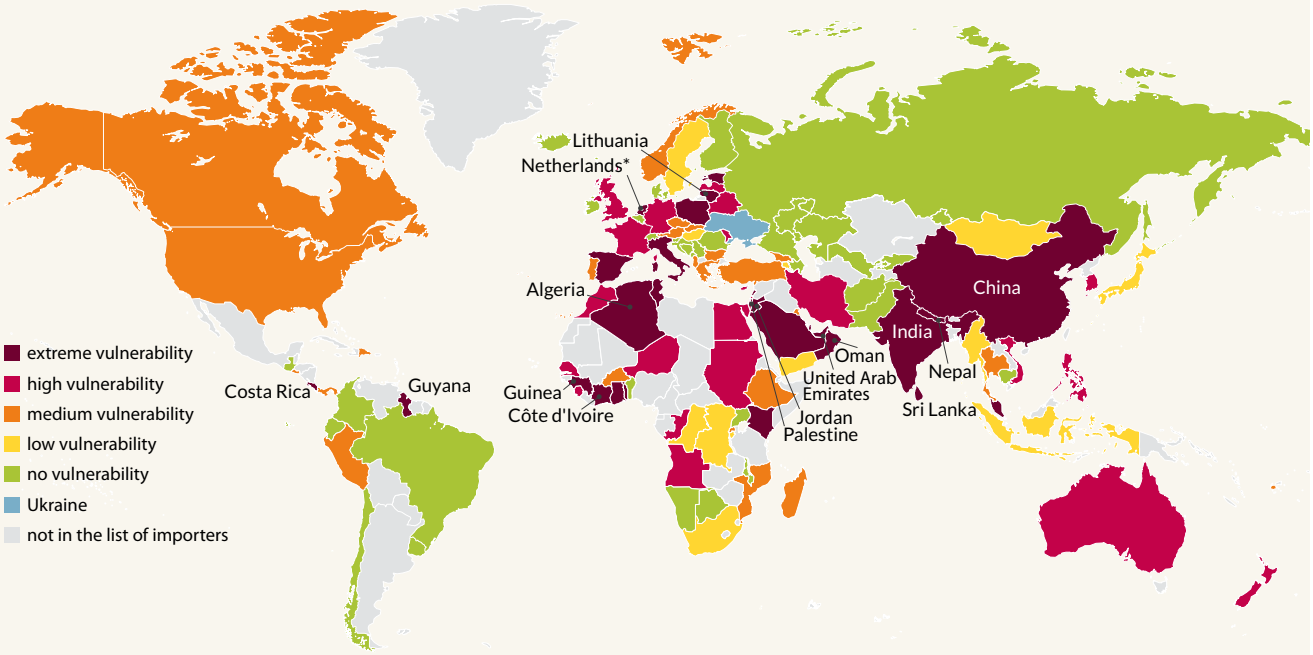
21 According to Ukrstat, see http://ukrstat.gov.ua/operativ/operativ2006/pr/prm_ric/xls/vppv_2011_2020.xls.

FIGURE 9 **Top countries importing sunflower-seed oil from Ukraine, 2016–2020 average**



Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 10 **Domestic market vulnerability: sunflower-seed oil**



Note: *Result might be biased as the Netherlands serves as a hub. | Source: Own estimates | **© Bertelsmann Stiftung**

Domestic market vulnerability is proving extreme for 27 countries – India, Nepal, Oman, Guinea, United Arab Emirates, Côte d'Ivoire, Guyana, Algeria, Lithuania, the Netherlands, Jordan, Costa Rica, Palestine, Sri Lanka, China, Togo, Lebanon, Italy, Ghana, Poland, Spain, Kenya, Malaysia, Saudi Arabia, Qatar, Estonia, and Tunisia. The highest level is for India which gets 86% (Table A2.4) of its domestic market supply from Ukraine. There are a further 24 countries with high vulnerability and 28 with medium.

Unlike any other product analysed here, exposure to Ukraine's sunflower-seed oil exports is high across all continents.

The countries experiencing extreme vulnerability towards the disruption of Ukraine's exports of sunflower-seed oil are also among those experiencing the highest degree of global vulnerability. This is at its most acute in India, as it would need to receive almost 15% of global imports to cover the shortfall. The growing absence of Ukraine's sunflower-seed oil from the Indian – as well as other – markets is unlikely to be made good by other sunflower-seed oil producers in the short run. The use of other vegetable oils could be the solution if technology/taste allows.

TABLE 4 **The domestic market and global vulnerabilities of top 15 importing countries – sunflower-seed oil**

	Country	Domestic market vulnerability	Global vulnerability
1	**India**	**extreme**	**14.6%**
2	Nepal	extreme	0.4%
3	**Oman**	**extreme**	**1.7%**
4	Guinea	extreme	0.001%
5	United Arab Emirates	extreme	0.5%
6	Côte d'Ivoire	extreme	0.03%
7	Guyana	extreme	0.005%
8	Algeria	extreme	0.4%
9	Lithuania	extreme	0.2%
10	**Netherlands***	**extreme**	**2.9%**
11	Jordan	extreme	0.3%
12	Costa Rica	extreme	0.03%
13	Palestine	extreme	0.1%
14	Sri Lanka	extreme	0.01%
15	**China**	**extreme**	**5.1%**

Note: *Result might be biased as the Netherlands serves as a hub.
Source: WITS, FAO, own estimates. |

Soybeans

In the 2021/2022 marketing year, global soybeans production was 349m tons, of which about 156m are earmarked for international trade.[22] The main exporters are Brazil, the USA, Argentina, Paraguay and Canada, together accounting for almost 95% of global exports (Table A1.8).

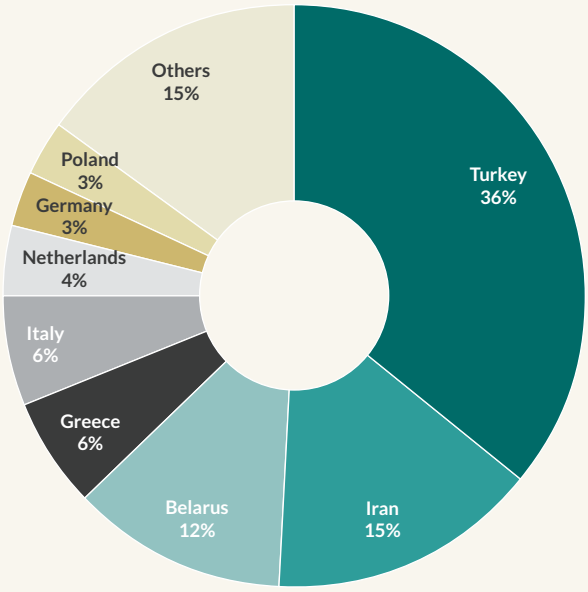
Ukraine harvested 3m tons of soybeans in the 2021/2022 marketing year, with about two-thirds destined for export.

We analysed 49 countries importing soybeans from Ukraine in 2016–2020. The largest importers by value[23] were Turkey, Iran and Belarus, accounting for almost two-thirds of Ukraine's soybeans exports.

22 According to the World Agricultural Demand and Supply Estimates by the US Department of Agriculture, May 2022, see https://www.usda.gov/oce/commodity/wasde/wasde0522.pdf.

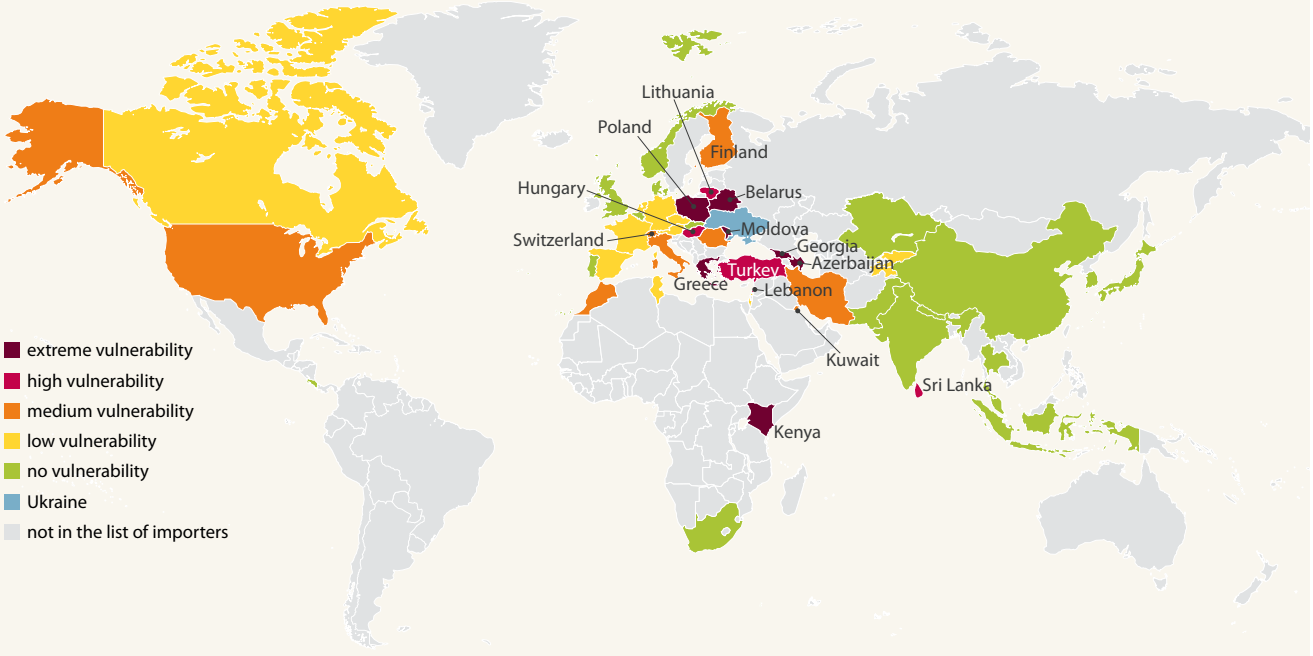
23 As these are commodities with close prices, the volume structure is very similar.

FIGURE 11 **Top countries importing soybeans from Ukraine, 2016–2020 average**

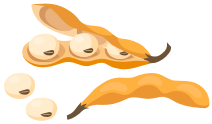


Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 12 **Domestic market vulnerability: soybeans**



Source: Own estimates | **© Bertelsmann Stiftung**



Domestic market vulnerability to disruptions is extreme for seven countries – Georgia, Belarus, Kenya, Poland, Moldova, Greece and Azerbaijan. The highest level of dependence affects Georgia, which used to get 99% of its domestic supply of soybeans from Ukraine. Belarus used to source 81% of its domestic market supply from Ukraine, while trade relations between the countries have now ceased (Table A2.5).

Five countries – Turkey, Sri Lanka, Lithuania, Hungary, and Lebanon – are highly vulnerable. A further eight show a medium level of vulnerability.

Regionally, Europe is the most vulnerable.

Seven countries featuring extreme vulnerability towards disruption in Ukraine's exports of soybeans do not figure high on the global vulnerability list. Georgia would in fact require a miniscule 0.002% of global trade or just 4,500 tons to make up for its shortfall. Moreover, other countries with high and medium vulnerability also require a small share of global imports to compensate. On the other hand, Ukraine supplies the GMO-free soybeans that makes them much harder to substitute.

TABLE 5 **The domestic market and global vulnerabilities of top 15 importing countries – soybeans**

	Country	Domestic market vulnerability	Global vulnerability
1	Georgia	extreme	0.002%
2	**Belarus**	**extreme**	**0.1%**
3	Kenya	extreme	0.01%
4	Poland	extreme	0.03%
5	Moldova	extreme	0.00004%
6	Greece	extreme	0.06%
7	Azerbaijan	extreme	0.004%
8	**Turkey**	**high**	**0.4%**
9	Sri Lanka	high	0.002%
10	Lithuania	high	0.0004%
11	Hungary	high	0.01%
12	Lebanon	high	0.01%
13	Kuwait	medium	0.0001%
14	Finland	medium	0.003%
15	Switzerland	medium	0.001%

Source: WITS, FAO, own estimates. |

Poultry

Global poultry production is about 150m tons, of which only about 20m is traded globally.[24] The main exporters are Brazil, the USA, Poland and the Netherlands, together accounting for about 58% of global exports (Table A1.9).

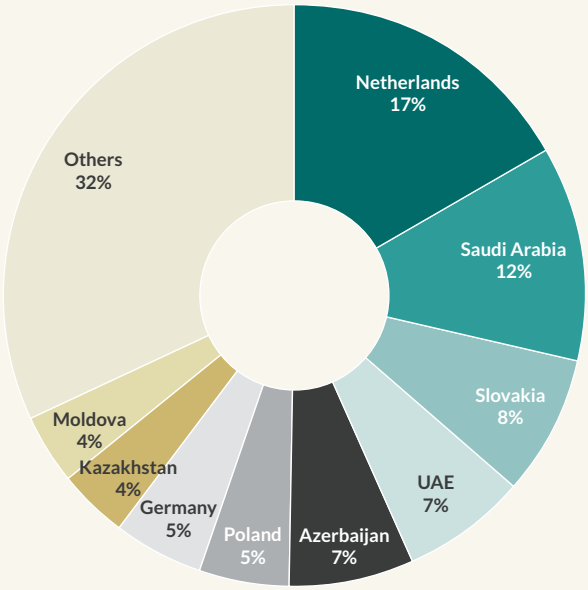
In 2021, Ukraine produced about 1.6m tons of poultry, about a quarter of which was expected to be shipped abroad.

We analysed 80 countries importing poultry from Ukraine in 2016–2020. The largest importers were the Netherlands, Saudi Arabia, and Slovakia, accounting for about one-third of Ukraine's poultry exports. A tariff-rate quota had constrained poultry exports to the EU market. After the tariff rate quota coverage was revised in 2019,[25] the non-quota supply has become less

24 According to FAO, see https://www.fao.org/faostat/en/.

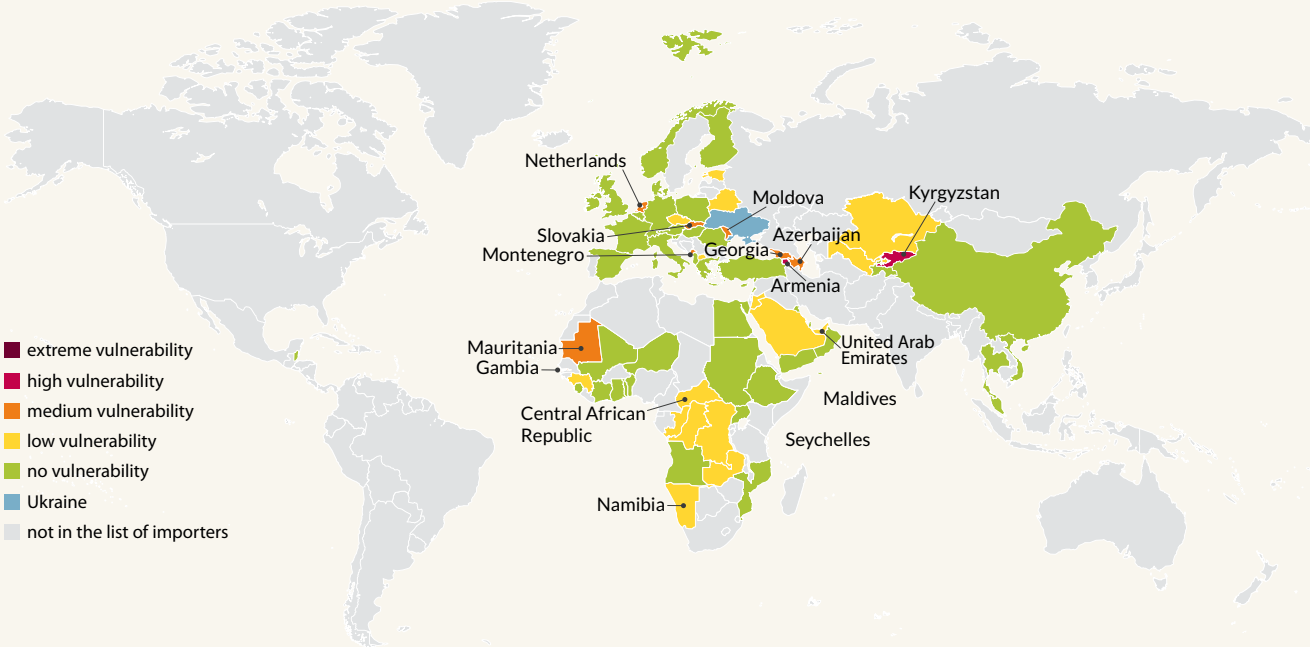
25 It was revised in response to complaints about a sharp increase in Ukraine's exports of poultry to the EU, using the incomplete coverage of TRQ; see https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A22019A0806%2801%29.

FIGURE 13 **Top countries importing poultry from Ukraine, 2016–2020 average**



Source: WITS, own estimates; data based on importing countries' statistics | **© Bertelsmann Stiftung**

FIGURE 14 **Domestic market vulnerability: poultry**



Source: Own estimates | **© Bertelsmann Stiftung**

attractive given the MFN duties applied by the EU that lead to higher prices for European consumers vis-à-vis growing demand in other countries.

Domestic market vulnerability to disruption in Ukrainian exports is generally lower than for other analysed products: uniquely, no countries show extreme vulnerability.

There are two countries with high vulnerability: Kyrgyzstan and Armenia. Nine more experience a medium level: Slovakia, Moldova, Azerbaijan, Georgia, the Netherlands, Seychelles, Gambia, Montenegro, and Mauritania (Table A2.6).

Regionally, Europe and Asia are the most vulnerable.

Global vulnerability to disruptions in Ukraine's poultry exports is at a low level. Two countries displaying high domestic market vulnerability requires 0.1% of global import each or less than 20,000 tons per country to compensate for the disruption.

TABLE 6 **The domestic market and global vulnerabilities of top 15 importing countries – poultry**

	Country	Domestic market vulnerability	Global vulnerability
1	Kyrgyzstan	high	0.1%
2	Armenia	high	0.1%
3	Slovakia	medium	0.2%
4	Moldova	medium	0.1%
5	Azerbaijan	medium	0.1%
6	Georgia	medium	0.1%
7	Netherlands	medium	0.4%
8	Seychelles	medium	0.004%
9	Gambia	medium	0.02%
10	Montenegro	medium	0.01%
11	Mauritania	medium	0.02%
12	Central African Republic	low	0.003%
13	Namibia	low	0.01%
14	United Arab Emirates	low	0.2%
15	Maldives	low	0.004%

Source: WITS, FAO, own estimates. |

4. Summary of domestic market vulnerability

Altogether, we analysed 141 countries that imported at least one of the six products under study – wheat, barley, maize, sunflower-seed oil, soybeans and poultry – from Ukraine in 2016–2020. Twenty-two countries imported all six products, while 25 imported only one of the six. Altogether, we identified 480 country-product pairs (cases) in our analysis.[26]

Thirty-nine of these 480 paired cases, or 8% of the total, demonstrate the extreme level of domestic market vulnerability. In most cases, that exposure is related to imports of sunflower-seed oil from Ukraine. There are seven countries featuring two instances of extreme vulnerability – Lebanon (wheat and sunflower-seed oil), Tunisia (maize and sunflower-seed oil), Sri Lanka (barley and sunflower-seed oil), the Netherlands (maize and poultry), Lithuania (maize and sunflower-seed oil), Kenya (soybeans and sunflower-seed oil) and Poland (soybeans and sunflower-seed oil).

There are 55 cases of high vulnerability accounting for 11% of the 480 total. Sunflower-seed oil exposure dominates here too. There are two countries with high levels of vulnerability for three products: Lebanon (barley, maize and soybeans) and Cyprus (barley, maize and sunflower-seed oil). There are also four countries featuring two instances of high vulnerability – Israel (maize and sunflower-seed oil), Egypt (maize and sunflower-seed oil), Korea (wheat and sunflower-seed oil), and the United Kingdom (maize and sunflower-seed oil). Medium vulnerability is registered in 16% of cases (78 product-country pairs), low vulnerability in 19% of cases, while the most common is zero vulnerability (46%).

We weighted the level of vulnerability by assigning 100 to extreme vulnerability, 75 to high, 50 to medium, 25 to low, and zero to none. Here, the highest aggregate level of vulnerability is detected in Lebanon, Tunisia and Sri Lanka. The countries with the most acute domestic market vulnerability tend to have a small share of global imports and that increases their prospects for coping with the supply shock. However, effective mitigation is far from guaranteed. Two of the three most exposed countries, namely Tunisia and Sri Lanka, are lower-middle income, so their financial capacity is further constrained as import prices soar. Such countries may not be able to afford the higher cost of importing the required volumes of products.

The most vulnerable countries are located in Asia, Africa and Europe, while American vulnerability is low.

26 The 'country-product' pair (case) means the combination of the country and the individual product out of the named six products, for which the country's imports from Ukraine existed in 2016–2020. Each country with non-zero imports from Ukraine can have between one and six country-product pairs. For instance, for Australia, there is only one pair (case) "Australia – sunflower-seed oil". For Lebanon, there are six pairs (cases) as the country imports all six named products from Ukraine.

TABLE 7 **The aggregate vulnerability of domestic markets of importing countries**

Country	Index of individual vulnerability (min = 0, max = 600)	Max share in global imports and for what product	Income level by World Bank classification (2021)
Lebanon	425	0.3% sunflower-seed oil	Upper-middle
Tunisia	350	0.5% maize	Lower-middle
Sri Lanka	325	0.01% wheat	Lower-middle
Netherlands*	300	2.9% sunflower-seed oil	High
Israel	275	0.2% barley	High
Qatar	275	0.07% barley	High
Lithuania	275	0.2% sunflower-seed oil	High
Spain	250	2.9% sunflower-seed oil	High
Cyprus	250	0.1% barley	High
Jordan	250	0.5% barley	Upper-middle

Note: *Result might be biased as the Netherlands serves as a hub.
Source: Own estimates, World Bank classification of countries by income level, https://datahelpdesk.worldbank.org/knowledgebase/articles/906519

5. Conclusions: policy recommendations and action bits

Over the past two decades, Ukraine has become the global supplier of primary agriculture and food commodities, being the number two exporter of cereals worldwide and the number one exporter of sunflower-seed oil. The country has also been gaining importance as an exporter of poultry. Ukraine's agri-food exports have been directed primarily to Asia, Africa and Europe.

The full-scale Russian military aggression against Ukraine has caused major disruptions in its agriculture and food exports. Russia has "temporarily occupied"[27] or blocked Ukraine's seaports, the main gateway for shipping its agricultural products worldwide. The volume of grain exports dropped from the typical 5–6m tons per month to a mere 0.2m in March 2022, rising higher but reaching only the still insufficient volume of 1.2m tons in April. Railways have become the main transport mode for exporting grains, but their capacity in Ukraine and its western neighbours has been inadequate to process the required volume. It is estimated that Ukraine has been forced to continue storing at least 20m tons of its 2021/2022 harvest for exports.

Military action and its consequences, including the temporary occupation, the serious spoliation of territories, and shortages of labour, capital and inputs are likely to result in a sharp drop in Ukraine's harvest in the 2022/2023 marketing year. Ukraine may see yields at least 30m tons lower than the record high of 86m tons in 2021/2022. Exports are expected to halve. What's more, this amount has yet to be shipped, adding to the current logistic backlog.

Given these logistical constraints, Ukraine's export trade will likely be mainly oriented towards Europe, potentially leaving the rest of the world undersupplied. Indeed, our domestic vulnerability analysis shows that the three most exposed countries – Lebanon, Tunisia and Sri Lanka – lie outside Europe.

27 „Temporary occupation" is the official term used by Ukraine for all de facto occupied territories, since 2014 and after February 24, 2022, including Crimea.

In general, this assessment shows that the cases of extreme and high vulnerability, where a country sources over 15% of its domestic supply from Ukraine, are quite widespread, accounting for 19% of total cases. In addition, medium vulnerability accounts for another 16% of the total, so over one third of the analysed country-product pairs are vulnerable and require the close attention of their respective governments and the international community.

We have identified 39 cases of extreme vulnerability. For all products, except poultry, there are countries featuring extreme vulnerability. Moreover, domestic markets in seven countries – Lebanon, Tunisia, Sri Lanka, the Netherland, Lithuania, Kenya and Poland – are extremely vulnerable to Ukrainian export disruptions in two different products.

In terms of individual products, countries are at their most vulnerable to disruption in Ukraine's exports of sunflower-seed oil, soybeans and maize and least vulnerable for poultry. Regionally, Europe, Asia and Africa are the most exposed.

The analysis shows that the countries with the highest domestic market vulnerability tend to source from Ukraine a very small proportion of global imports, thereby raising the prospects for coping with the shock. Still, the sharp price increases on commodity markets make agricultural products far less affordable. This is a particular concern for two of the three most exposed countries – Sri Lanka and Tunisia, both lower-middle-income countries with a limited wherewithal for mitigating the shock.

Action is required on both the supply and demand sides, thus unblocking and increasing the supply of agricultural and food products and, at the same time, supporting the most crucial needs and ensuring the efficient use of available resources.

On the *supply side*, the measures should target Ukraine primarily. The crucial and immediate need is to ease the logistical backlog, thus unblocking the remaining 2021/2022 exports and ensuring that the 2022/2023 harvest reaches market.

In May 2022, the European Commission released an action plan for EU-Ukraine Solidarity Lanes to facilitate Ukraine's agricultural export and bilateral trade with the EU.[28] To address the immediate supply needs of railways, the plan proposes to:

- Urgently mobilise the available necessary equipment, rolling stock, vehicles, barges and vessels on the EU market;
- Make available the required rail slots between transhipment centres and EU ports;
- Prioritize Ukrainian agricultural export shipments towards freight corridors with the best available capacity;
- Identify the critical transhipment/gauge changing centres at and beyond EU-Ukraine borders to optimise the volumes;
- Facilitate lending or selling and stepping up manufacture of mobile grain loaders to relevant transhipment locations;
- Investigate whether additional top-level guarantees for freight carriers are needed and cooperate with international financial institutions to provide them;
- Establish a matchmaking platform to facilitate exchanges between logistics chain actors to optimise cargo flow and identify a dedicated Solidarity Lanes contact point for problem notification.

As for shipments by road, the measures include reaching a road transport agreement as allowed by the Association Agreement between Ukraine and the EU. A Council mandate is still required. The EC also intends to adopt legislation laying down specific and temporary measures concerning Ukrainian driver documents and working standards, i.e., allowing for monitoring the issuance of driver tachograph cards.[29]

As for the long term, the EC promised to evaluate the extension of TEN-T[30] corridors in Ukraine that would offer increased infrastructure connectivity with the EU by laying EU standard-gauge rail lines in both Ukraine and Moldova. A high-level agreement with Ukraine on revising the TEN-T Maps is proposed.

Meantime, the removal of Ukraine's seaport blockade should remain on the agenda. Ukraine's grain exports, previously about 5–6m tons per month, used to be shipped predominantly via its seaports. While shipments by road and especially rail did absorb some of the export losses caused by the Russian occupation or blockade of Ukraine's ports in April and May 2022, the alternative shipments via rail and river ports still falls far below Ukraine's needs, and volumes and pace of exports of agricultural products are still significantly inferior to the same period in 2021 (see section 2). Therefore, the possibility of international convoys should be assessed. However, the use of seaports is unlikely to be immediate once the blockade is over, as de-mining must come first.

To overcome the capital and input constraints, easing the financial needs of agricultural producers by providing additional credit lines and insurance and recreating production facilities and infrastructure is vital. In the Solidarity Lanes plan, the EC suggests providing guidance on the available funding and on the most appropriate procurement procedures to support (re-)building or strengthening infrastructure where quick interventions can bring swift results.

On the *demand side*, financial support for countries with the most vulnerable domestic markets is required, with international institutions taking the lead. However, this support should be coupled with reforms in sectoral policies to reduce future exposure and ensure that the resources are used effectively. The example of Tunisia is striking. Our analysis shows that the country is highly vulnerable to the wheat supply shock and requires support. At the same time, Tunisian wheat consumption exceeds the world average threefold, and the government heavily regulates the market, thus generating massive inefficiencies.[31]

28 See https://transport.ec.europa.eu/news/european-commission-establish-solidarity-lanes-help-ukraine-export-agricultural-goods-2022-05-12_en.

29 The tachograph driver card is a plastic card with a microchip that can store data required for EU Drivers' Hours regulations including break and rest times of drivers.

30 The Trans-European Transport Network (TEN-T) policy addresses the implementation and development of a Europe-wide network of railway lines, roads, inland waterways, maritime shipping routes, ports, airports and railroad terminals. TEN-T comprises of the Corridors, identified to streamline and facilitate the coordinated development of the Network. See https://transport.ec.europa.eu/transport-themes/infrastructure-and-investment/trans-european-transport-network-ten-t_en.

31 See A Global Food Crisis – More Fallout from Russia's War in Ukraine, May 19, 2022, https://globaleurope.eu/globalization/a-global-food-crisis-more-fallout-from-russias-war-in-ukraine/.

While the benefits of international trade and interdependency are unchallengeable, the world still needs better mechanisms to secure essential food supplies globally, tackling the needs of the most vulnerable people and countries. The strengthened competitive trade structures enabling the adaptation and diffusion of innovations and resource-efficient processes along internationally integrated agricultural production and supply chains would be indispensable to cope with supply shocks on the global scale we have described.

Annex 1 The role of Ukraine in the global supply of primary agriculture and food products

TABLE A1.1 **Top 10 exporters of cereals (HS 10) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	United States of America	19.6	17.9	18.8	15.3	16.2
2	**Ukraine**	**6.3**	**6.2**	**6.5**	**8.7**	**7.9**
3	Russian Federation	5.8	7.2	9.3	7.2	7.8
4	Argentina	7.2	6.7	6.7	8.5	7.5
5	India	5.8	7	6.9	6.4	7.3
6	Canada	5.8	6	6.4	6.1	6.5
7	France	6.4	5.4	6.5	6.7	6.5
8	Brazil	4.3	4.8	4.1	7.2	5.4
9	Australia	5.3	6.3	4.3	3.1	3.2
10	Thailand	4.7	5.1	5.1	3.9	3.2

Source: ITC Trade Map

TABLE A1.2 **Top 10 exporters of wheat (HS 1001) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	Russian Federation	11.5	14.8	20.5	15.8	17.6
2	United States of America	14.7	15.6	13.3	15.5	14.1
3	Canada	12.3	13	13.9	13.3	14
4	France	9.2	7.7	10	10.7	10.1
5	**Ukraine**	**7.4**	**7.1**	**7.3**	**9.0**	**8.0**
6	Australia	9.9	12	7.5	6.2	6.0
7	Argentina	5.1	6	6	6	4.7
8	Germany	5.3	4.1	2.8	3.1	4.7
9	Kazakhstan	1.9	1.7	2.3	2.5	2.5
10	Poland	2.2	1.4	1	1.1	2.3

Source: ITC Trade Map

TABLE A1.3 **Top 10 exporters of barley (HS 1003) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	France	17.4	14.5	17.3	21.6	18.3
2	Australia	18.2	23.3	17.9	10.4	12.3
3	Russian Federation	6.9	10.5	13.3	10.9	12.1
4	**Ukraine**	**10.8**	**10.2**	**8.9**	**10.1**	**11.8**
5	Canada	4.7	5.9	6.8	7.6	8
6	Germany	8.1	6.1	5	4.4	6.5
7	Argentina	9.7	6.5	7.5	10.3	6
8	United Kingdom	5.1	2.9	2.5	5.2	4.1
9	Romania	3.5	3.5	3.6	3	3.3
10	Kazakhstan	1.8	2	3.8	4.3	2.4

Source: ITC Trade Map

TABLE A1.4 **Top 10 exporters of maize (HS 1005) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	United States of America	35	31.6	38.2	22.5	26
2	Argentina	14.3	12.8	12.6	16.6	16.5
3	Brazil	12.8	15.3	12.1	20.7	15.9
4	**Ukraine**	**9**	**9.9**	**10.4**	**14.6**	**13.2**
5	France	5.6	4.8	4.9	3.8	4.7
6	Romania	2.6	2.7	3	3.9	3.3
7	Hungary	2.4	3	2.3	2.4	2.8
8	Serbia	1.3	1	0.7	1.5	1.7
9	South Africa	1.1	1.6	1.3	0.8	1.5
10	Bulgaria	0.8	0.6	0.8	1.3	1.4

Source: ITC Trade Map

TABLE A1.5 **Top 10 exporters of fats and vegetable oils (HS 15) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	Indonesia	20.7	23.2	21.7	19.8	20.3
2	Malaysia	14.3	13.7	12.8	12.9	13.2
3	**Ukraine**	**4.5**	**4.7**	**4.8**	**5.3**	**5.6**
4	Netherlands	5.5	5.5	5.3	5.3	5.3
5	Spain	5.3	5.6	5.5	5.2	4.7
6	Argentina	5.7	4.9	4.2	5.3	4.7
7	Russian Federation	2.5	2.7	2.8	3.9	3.8
8	United States of America	3.6	3.3	3.4	3.5	3.5
9	Canada	3.3	3.2	3.5	3.6	3.4
10	Germany	3.5	3.3	3.2	3.1	3.1

Source: ITC Trade Map

TABLE A1.6 **Top 10 exporters of sunflower-seed, safflower or cottonseed oil and fractions thereof (HS 1512) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	**Ukraine**	**37.8**	**39.1**	**38.5**	**36.6**	**39.5**
2	Russian Federation	14.7	16.2	15	18.9	18.3
3	Turkey	6.5	5	4	4.3	5.5
4	Netherlands	5.5	5.1	5.2	4.8	5.4
5	Hungary	4.4	4.6	4.8	4.2	3.6
6	Argentina	5.2	5.5	5.3	5.9	3.4
7	Bulgaria	2.2	2.5	3.1	2.7	3.4
8	France	4.6	3.7	4	3.1	3
9	Spain	2.2	2.2	2.2	2	1.9
10	Germany	1.7	1.6	1.7	2	1.7

Source: ITC Trade Map

TABLE A1.7 **Top 10 exporters of oilseeds (HS 12) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	United States of America	30.9	26.9	22.3	24.8	28
2	Brazil	21.8	26.5	33.4	27.4	26.4
3	Canada	8	8	7.6	5.8	6.9
4	Netherlands	3.5	3.6	3.6	3.7	3.9
5	Argentina	4.3	3.2	1.8	4.2	3.1
6	China	3	2.7	2.7	3	2.6
7	Paraguay	2.1	2.2	2.3	1.7	2.1
8	France	2.2	2.1	2.2	2.3	2.0
9	**Ukraine**	**1.7**	**2.1**	**1.9**	**2.7**	**1.7**
10	India	1.9	1.8	1.6	1.8	1.7

Source: ITC Trade Map

TABLE A1.8 **Top 10 exporters of soybeans (HS 1201) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	Brazil	36.8	44.3	55.9	47.2	44.6
2	United States of America	43.6	37.1	28.9	33.9	40
3	Argentina	6.2	4.7	2.5	6.3	3.7
4	Paraguay	3.5	3.7	3.7	2.8	3.4
5	Canada	3.6	3.3	3.7	2.8	3
6	Uruguay	1.5	2.1	0.9	1.8	1.2
7	**Ukraine**	**1.9**	**1.8**	**1.4**	**2.1**	**1.1**
8	Netherlands	0.9	0.7	0.7	0.7	0.7
9	Russian Federation	0.3	0.3	0.5	0.5	0.6
10	Croatia	0.1	0.2	0.1	0.1	0.2

Source: ITC Trade Map

TABLE A1.9 **Top 10 exporters of poultry (HS 0207) globally, 2016–2020, % of total**

		2016	2017	2018	2019	2020
1	Brazil	25.5	25.5	22.2	23.5	22.1
2	United States of America	13.8	14.1	13.4	13.7	15.3
3	Poland	7.7	8.2	10.3	10.7	10.6
4	Netherlands	10.3	9.8	10.5	10.2	10.3
5	Thailand	2.1	2.4	2.6	3	3.6
6	Germany	4.2	4	3.9	3.7	3.5
7	Belgium	3.8	3.7	3.7	3.3	3.5
8	France	4	3.7	3.7	3.3	3.1
9	China	2.2	2.2	2.1	2.3	2.2
10	**Ukraine**	**1.2**	**1.5**	**1.9**	**2.1**	**2.2**

Source: ITC Trade Map

Annex 2 The individual countries' vulnerability

TABLE A2.1 **Wheat**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	Lebanon	56.9%	83%	47%	extreme	0.16%
2	Thailand	28.4%	100%	28%	high	0.47%
3	Mauritania	24.9%	99%	25%	high	0.08%
4	Tunisia	38.0%	65%	25%	high	0.39%
5	Indonesia	23.2%	100%	23%	high	1.16%
6	Korea	16.8%	99%	17%	high	0.38%
7	Yemen	16.5%	97%	16%	high	0.16%
8	Philippines	14.6%	100%	15%	medium	0.48%
9	Israel	13.6%	94%	13%	medium	0.10%
10	Uganda	12.4%	96%	12%	medium	0.04%
11	Malaysia	11.8%	100%	12%	medium	0.08%
12	Egypt	21.2%	56%	12%	medium	1.09%
13	Jordan	10.9%	100%	11%	medium	0.06%
14	Qatar	9.8%	100%	10%	medium	0.01%
15	Senegal	9.3%	100%	9%	medium	0.04%
16	Morocco	18.4%	45%	8%	medium	0.44%
17	Kenya	8.4%	86%	7%	medium	0.07%
18	Mali	7.7%	91%	7%	medium	0.01%
19	Myanmar	7.3%	77%	6%	medium	0.01%
20	Zimbabwe	6.5%	78%	5%	medium	0.01%
21	Spain	9.8%	46%	5%	low	0.28%
22	Côte d'Ivoire	4.5%	100%	4%	low	0.02%
23	Cambodia	4.4%	100%	4%	low	0.00%
24	Ethiopia	18.1%	22%	4%	low	0.12%
25	DR Congo	3.9%	97%	4%	low	0.02%
26	Mozambique	3.8%	98%	4%	low	0.01%
27	Malawi	3.3%	100%	3%	low	0.00%
28	Cyprus	3.6%	79%	3%	low	0.00%
29	Sri Lanka	2.5%	100%	2%	low	0.01%
30	United Arab Emirates	2.3%	100%	2%	low	0.02%
31	Greece	4.4%	52%	2%	low	0.02%
32	Mexico	3.4%	64%	2%	low	0.00%
33	South Africa	3.9%	52%	2%	low	0.04%
34	Turkey	8.0%	24%	2%	low	0.27%
35	Italy	3.5%	52%	2%	low	0.15%
36	Nigeria	1.8%	99%	2%	low	0.05%
37	Palestine	2.1%	82%	2%	low	0.00%
38	Angola	1.7%	99%	2%	low	0.00%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
39	Oman	1.4%	100%	1%	low	0.01%
40	Ecuador	1.3%	99%	1%	low	0.01%
41	Viet Nam	1.2%	100%	1%	low	0.06%
42	Albania	2.5%	46%	1%	low	0.01%
43	Pakistan	45.7%	2%	1%	low	0.55%
44	Netherlands	1.3%	88%	1%	low	0.02%
45	Botswana	0.9%	100%	1%	none	0.00%
46	Burkina Faso	0.9%	100%	1%	none	0.00%
47	Algeria	1.2%	72%	1%	none	0.05%
48	Switzerland	1.7%	47%	1%	none	0.00%
49	Armenia	1.3%	58%	1%	none	0.01%
50	Eswatini	0.8%	99%	1%	none	0.00%
51	Sudan	1.0%	76%	1%	none	0.03%
52	Saudi Arabia	0.8%	83%	1%	none	0.03%
53	Malta	0.6%	100%	1%	none	0.00%
54	India	45.7%	1%	1%	none	0.82%
55	Japan	0.6%	86%	0%	none	0.03%
56	Portugal	0.5%	96%	0%	none	0.01%
57	Austria	0.8%	51%	0%	none	0.00%
58	Belarus	7.1%	5%	0%	none	0.01%
59	Azerbaijan	0.9%	41%	0%	none	0.00%
60	United Kingdom	2.1%	12%	0%	none	0.02%
61	Norway	0.4%	50%	0%	none	0.00%
62	Lithuania	2.2%	8%	0%	none	0.00%
63	Germany	0.6%	21%	0%	none	0.01%
64	Burundi	0.1%	89%	0%	none	0.00%
65	Nepal	1.4%	9%	0%	none	0.00%
66	Denmark	1.9%	6%	0%	none	0.00%
67	Moldova	38.9%	0%	0%	none	0.00%
68	Poland	1.0%	8%	0%	none	0.00%
69	Russia	10.7%	1%	0%	none	0.05%
70	Slovenia	0.1%	93%	0%	none	0.00%
71	Iran	0.8%	7%	0%	none	0.00%
72	Georgia	0.1%	83%	0%	none	0.00%
73	Bulgaria	1.7%	2%	0%	none	0.00%
74	Bahrain	0.0%	100%	0%	none	0.00%
75	France	0.9%	3%	0%	none	0.00%
76	Kuwait	0.0%	100%	0%	none	0.00%
77	Ghana	0.0%	100%	0%	none	0.00%
78	Hungary	0.4%	5%	0%	none	0.00%
79	New Zealand	0.0%	54%	0%	none	0.00%
80	Latvia	0.0%	100%	0%	none	0.00%
81	Kazakhstan	0.1%	2%	0%	none	0.00%
82	Romania	0.0%	25%	0%	none	0.00%
83	Montenegro	0.0%	90%	0%	none	0.00%
84	Serbia	0.2%	0%	0%	none	0.00%
85	USA	0.0%	8%	0%	none	0.00%
86	Bosnia and Herzegovina	0.0%	60%	0%	none	0.00%

Source: WITS, FAO, own estimates

TABLE A2.2 **Barley**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	Sri Lanka	44.2%	100%	44%	extreme	0.01%
2	Qatar	24.6%	100%	25%	high	0.07%
3	Saudi Arabia	21.3%	92%	20%	high	4.16%
4	Cyprus	22.1%	86%	19%	high	0.14%
5	Lebanon	25.5%	73%	19%	high	0.12%
6	Guyana	18.4%	100%	18%	high	0.00%
7	Malaysia	14.5%	100%	14%	medium	0.00%
8	Jordan	13.6%	100%	14%	medium	0.53%
9	Israel	12.8%	98%	12%	medium	0.15%
10	Oman	12.4%	99%	12%	medium	0.06%
11	Bahrain	12.0%	100%	12%	medium	0.00%
12	Pakistan	51.6%	21%	11%	medium	0.03%
13	China	12.3%	87%	11%	medium	3.33%
14	Tunisia	15.8%	58%	9%	medium	0.37%
15	Kuwait	7.5%	99%	7%	medium	0.15%
16	Algeria	23.0%	31%	7%	medium	0.61%
17	United Arab Emirates	4.7%	100%	5%	low	0.07%
18	Egypt	33.7%	14%	5%	low	0.02%
19	Myanmar	3.1%	100%	3%	low	0.00%
20	Greece	12.9%	21%	3%	low	0.06%
21	Japan	3.1%	86%	3%	low	0.24%
22	Morocco	10.3%	24%	2%	low	0.25%
23	Romania	3.8%	58%	2%	low	0.05%
24	Portugal	1.6%	91%	1%	low	0.11%
25	Spain	13.8%	10%	1%	low	0.47%
26	Turkey	18.8%	6%	1%	low	0.40%
27	Philippines	0.9%	100%	1%	none	0.00%
28	Italy	2.0%	37%	1%	none	0.08%
29	Belarus	9.9%	7%	1%	none	0.05%
30	Armenia	3.7%	12%	0%	none	0.00%
31	Czechia	9.3%	4%	0%	none	0.04%
32	Poland	5.8%	6%	0%	none	0.05%
33	Netherlands	0.3%	94%	0%	none	0.02%
34	Moldova	51.4%	0%	0%	none	0.00%
35	Switzerland	0.9%	21%	0%	none	0.00%
36	Slovakia	0.9%	15%	0%	none	0.00%
37	Russia	18.7%	1%	0%	none	0.10%
38	Georgia	1.2%	8%	0%	none	0.00%
39	Austria	0.2%	23%	0%	none	0.00%
40	Ireland	0.4%	11%	0%	none	0.02%
41	Thailand	0.1%	63%	0%	none	0.00%
42	Viet Nam	0.0%	100%	0%	none	0.00%
43	South Africa	0.2%	10%	0%	none	0.00%
44	Iran	0.1%	39%	0%	none	0.01%
45	United Kingdom	1.3%	2%	0%	none	0.01%
46	Denmark	0.9%	2%	0%	none	0.00%
47	Germany	0.1%	14%	0%	none	0.00%
48	Azerbaijan	0.3%	3%	0%	none	0.00%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
49	Hungary	0.1%	4%	0%	none	0.00%
50	Tajikistan	0.1%	4%	0%	none	0.00%
51	India	0.0%	8%	0%	none	0.00%
52	France	0.0%	1%	0%	none	0.00%
53	Belgium	0.0%	92%	0%	none	0.00%
54	USA	0.0%	6%	0%	none	0.00%
55	Norway	0.0%	4%	0%	none	0.00%
56	Kazakhstan	0.0%	1%	0%	none	0.00%
57	Korea	0.0%	41%	0%	none	0.00%

Source: WITS, FAO, own estimates

TABLE A2.3 **Maize**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	Lithuania	64.1%	100%	64%	extreme	0.11%
2	Tunisia	62.6%	100%	63%	extreme	0.48%
3	Netherlands	45.6%	100%	46%	extreme	1.95%
4	Finland	31.1%	100%	31%	high	0.00%
5	Portugal	33.7%	77%	26%	high	0.55%
6	Ireland	24.0%	100%	24%	high	0.23%
7	Israel	24.7%	96%	24%	high	0.21%
8	Denmark	21.8%	100%	22%	high	0.08%
9	Spain	31.8%	67%	21%	high	1.98%
10	United Kingdom	21.1%	100%	21%	high	0.40%
11	Norway	19.6%	100%	20%	high	0.02%
12	Cyprus	18.5%	100%	18%	high	0.03%
13	Belgium	20.8%	88%	18%	high	0.29%
14	Lebanon	17.8%	100%	18%	high	0.07%
15	Egypt	30.1%	53%	16%	high	0.70%
16	Estonia	15.6%	100%	16%	high	0.00%
17	Mauritania	31.1%	45%	14%	medium	0.00%
18	Qatar	11.1%	98%	11%	medium	0.00%
19	Italy	23.1%	45%	10%	medium	0.97%
20	Latvia	8.5%	100%	9%	medium	0.01%
21	Seychelles	7.9%	100%	8%	medium	0.00%
22	Turkey	29.1%	27%	8%	medium	0.58%
23	Germany	14.3%	48%	7%	medium	0.46%
24	Korea	5.9%	99%	6%	medium	0.43%
25	Iran	6.5%	87%	6%	medium	0.39%
26	Malta	5.5%	100%	5%	medium	0.00%
27	Belarus	35.5%	13%	5%	low	0.05%
28	Sri Lanka	17.1%	27%	5%	low	0.01%
29	Sweden	4.7%	87%	4%	low	0.00%
30	Jordan	3.6%	100%	4%	low	0.02%
31	Morocco	3.2%	96%	3%	low	0.05%
32	Algeria	2.9%	100%	3%	low	0.09%
33	United Arab Emirates	2.5%	100%	2%	low	0.01%
34	China	67.7%	3%	2%	low	2.47%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
35	Kuwait	2.1%	94%	2%	low	0.00%
36	Oman	1.8%	96%	2%	low	0.00%
37	Greece	4.4%	32%	1%	low	0.03%
38	Poland	11.9%	10%	1%	low	0.08%
39	Georgia	3.6%	30%	1%	low	0.00%
40	Iceland	1.0%	100%	1%	none	0.00%
41	Switzerland	1.5%	48%	1%	none	0.00%
42	South Africa	7.1%	8%	1%	none	0.07%
43	Saudi Arabia	0.5%	97%	0%	none	0.01%
44	Kenya	3.6%	12%	0%	none	0.04%
45	Viet Nam	0.5%	66%	0%	none	0.06%
46	Senegal	0.8%	40%	0%	none	0.00%
47	Japan	0.3%	100%	0%	none	0.04%
48	Palestine	0.3%	100%	0%	none	0.00%
49	Austria	0.6%	37%	0%	none	0.00%
50	India	42.5%	1%	0%	none	0.11%
51	Côte d'Ivoire	14.3%	2%	0%	none	0.01%
52	Madagascar	11.7%	2%	0%	none	0.00%
53	Azerbaijan	0.7%	26%	0%	none	0.00%
54	Bahrain	0.2%	100%	0%	none	0.00%
55	France	2.3%	7%	0%	none	0.02%
56	Nigeria	5.0%	2%	0%	none	0.00%
57	Sierra Leone	3.4%	3%	0%	none	0.00%
58	Hungary	2.9%	3%	0%	none	0.01%
59	New Zealand	0.2%	40%	0%	none	0.00%
60	Uzbekistan	0.6%	10%	0%	none	0.00%
61	Kazakhstan	6.6%	1%	0%	none	0.00%
62	Angola	3.2%	2%	0%	none	0.00%
63	French Polynesia	0.1%	100%	0%	none	0.00%
64	Sudan	0.2%	28%	0%	none	0.00%
65	Czechia	0.2%	30%	0%	none	0.00%
66	Moldova	5.5%	1%	0%	none	0.00%
67	Romania	0.5%	7%	0%	none	0.00%
68	Canada	0.3%	12%	0%	none	0.00%
69	Indonesia	0.6%	5%	0%	none	0.02%
70	Costa Rica	0.0%	99%	0%	none	0.00%
71	Malaysia	0.0%	99%	0%	none	0.00%
72	Nepal	0.1%	15%	0%	none	0.00%
73	Bulgaria	0.0%	6%	0%	none	0.00%
74	Russia	0.5%	0%	0%	none	0.01%
75	Luxembourg	0.0%	100%	0%	none	0.00%
76	Chile	0.0%	65%	0%	none	0.00%
77	Bosnia and Herzegovina	0.0%	18%	0%	none	0.00%
78	Benin	0.2%	0%	0%	none	0.00%
79	Kyrgyzstan	0.0%	0%	0%	none	0.00%
80	Slovakia	0.0%	12%	0%	none	0.00%
81	Pakistan	0.0%	1%	0%	none	0.00%
82	Serbia	0.0%	0%	0%	none	0.00%

Source: WITS, FAO, own estimates

TABLE A2.4 **Sunflower-seed oil**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	India	88.7%	97%	86%	extreme	14.57%
2	Nepal	81.7%	100%	82%	extreme	0.40%
3	Oman	79.4%	100%	79%	extreme	1.74%
4	Guinea	75.6%	100%	76%	extreme	0.00%
5	United Arab Emirates	73.8%	100%	74%	extreme	0.45%
6	Côte d'Ivoire	72.7%	100%	73%	extreme	0.03%
7	Guyana	70.2%	100%	70%	extreme	0.00%
8	Algeria	67.3%	99%	66%	extreme	0.38%
9	Lithuania	62.3%	100%	62%	extreme	0.16%
10	Netherlands	61.6%	100%	62%	extreme	2.93%
11	Jordan	54.5%	100%	55%	extreme	0.26%
12	Costa Rica	54.5%	100%	54%	extreme	0.03%
13	Palestine	52.1%	100%	52%	extreme	0.06%
14	Sri Lanka	52.1%	100%	52%	extreme	0.01%
15	China	67.0%	76%	51%	extreme	5.08%
16	Togo	49.5%	100%	49%	extreme	0.01%
17	Lebanon	50.2%	98%	49%	extreme	0.34%
18	Italy	56.6%	85%	48%	extreme	2.35%
19	Ghana	46.9%	100%	47%	extreme	0.02%
20	Poland	46.4%	100%	46%	extreme	0.64%
21	Spain	66.9%	69%	46%	extreme	2.92%
22	Kenya	54.4%	84%	46%	extreme	0.03%
23	Malaysia	44.2%	100%	44%	extreme	0.34%
24	Saudi Arabia	40.2%	100%	40%	extreme	0.33%
25	Qatar	39.7%	100%	40%	extreme	0.05%
26	Estonia	37.9%	100%	38%	extreme	0.01%
27	Tunisia	40.9%	91%	37%	extreme	0.07%
28	Sudan	39.9%	82%	33%	high	0.31%
29	Israel	33.8%	87%	29%	high	0.06%
30	Malta	29.0%	100%	29%	high	0.00%
31	Congo	29.0%	100%	29%	high	0.00%
32	Cyprus	28.5%	100%	29%	high	0.02%
33	Republic of Korea	27.2%	100%	27%	high	0.07%
34	United Kingdom	26.5%	100%	26%	high	0.64%
35	France	40.3%	64%	26%	high	0.98%
36	Niger	25.3%	100%	25%	high	0.00%
37	Sierra Leone	24.8%	100%	25%	high	0.00%
38	New Zealand	23.9%	100%	24%	high	0.03%
39	Belarus	25.0%	92%	23%	high	0.15%
40	Morocco	23.6%	92%	22%	high	0.10%
41	Singapore	21.4%	100%	21%	high	0.05%
42	Egypt	20.6%	100%	21%	high	0.38%
43	Iran	22.8%	90%	20%	high	0.74%
44	Senegal	20.1%	100%	20%	high	0.02%
45	Moldova	76.9%	26%	20%	high	0.02%
46	Philippines	18.6%	100%	19%	high	0.01%
47	Viet Nam	17.6%	100%	18%	high	0.01%
48	Latvia	17.3%	100%	17%	high	0.01%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
49	Germany	16.5%	100%	17%	high	0.59%
50	Australia	18.1%	90%	16%	high	0.12%
51	Angola	22.8%	67%	15%	high	0.01%
52	Kuwait	14.9%	100%	15%	medium	0.02%
53	Burkina Faso	14.7%	100%	15%	medium	0.00%
54	El Salvador	14.3%	100%	14%	medium	0.00%
55	Bahrain	13.6%	100%	14%	medium	0.01%
56	Czechia	13.4%	100%	13%	medium	0.06%
57	Thailand	17.2%	77%	13%	medium	0.04%
58	Albania	13.2%	100%	13%	medium	0.04%
59	Panama	13.1%	100%	13%	medium	0.00%
60	Georgia	11.3%	99%	11%	medium	0.03%
61	Portugal	22.1%	49%	11%	medium	0.12%
62	Rwanda	9.6%	100%	10%	medium	0.01%
63	Dominican Republic	9.5%	100%	10%	medium	0.00%
64	USA	27.7%	34%	9%	medium	0.22%
65	Turkey	14.0%	67%	9%	medium	0.64%
66	Mozambique	8.2%	100%	8%	medium	0.01%
67	Madagascar	8.0%	100%	8%	medium	0.00%
68	Slovakia	7.9%	96%	8%	medium	0.03%
69	Greece	11.4%	66%	7%	medium	0.08%
70	Bulgaria	30.6%	23%	7%	medium	0.06%
71	Fiji	7.0%	100%	7%	medium	0.00%
72	Austria	8.6%	80%	7%	medium	0.03%
73	Ethiopia	6.0%	100%	6%	medium	0.06%
74	Grenada	5.9%	100%	6%	medium	0.00%
75	Mauritius	5.9%	100%	6%	medium	0.00%
76	Peru	5.9%	100%	6%	medium	0.01%
77	Canada	9.9%	58%	6%	medium	0.03%
78	Norway	5.5%	100%	5%	medium	0.00%
79	Comoros	5.2%	100%	5%	medium	0.00%
80	DR Congo	4.9%	100%	5%	low	0.00%
81	Japan	4.5%	99%	5%	low	0.02%
82	Yemen	4.4%	100%	4%	low	0.00%
83	Sweden	4.7%	92%	4%	low	0.01%
84	Indonesia	7.8%	54%	4%	low	0.01%
85	Mongolia	3.7%	100%	4%	low	0.00%
86	Myanmar	25.3%	14%	4%	low	0.04%
87	Hungary	22.8%	15%	3%	low	0.07%
88	Armenia	3.4%	97%	3%	low	0.01%
89	Barbados	3.3%	100%	3%	low	0.00%
90	Gambia	1.8%	100%	2%	low	0.00%
91	Seychelles	1.7%	100%	2%	low	0.00%
92	Burundi	1.3%	100%	1%	low	0.00%
93	South Africa	2.3%	49%	1%	low	0.05%
94	Switzerland	1.1%	88%	1%	none	0.01%
95	Romania	8.4%	12%	1%	none	0.02%
96	Belgium	0.8%	100%	1%	none	0.04%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
97	Azerbaijan	1.2%	66%	1%	none	0.00%
98	Uzbekistan	0.7%	83%	1%	none	0.01%
99	Denmark	0.6%	100%	1%	none	0.00%
100	Malawi	1.8%	25%	0%	none	0.00%
101	Maldives	0.4%	100%	0%	none	0.00%
102	Bosnia and Herzegovina	0.4%	100%	0%	none	0.01%
103	Guatemala	0.4%	100%	0%	none	0.00%
104	Cambodia	0.4%	100%	0%	none	0.00%
105	Russia	70.1%	0%	0%	none	0.11%
106	Finland	2.0%	15%	0%	none	0.00%
107	Kyrgyzstan	0.3%	99%	0%	none	0.00%
108	Montenegro	0.2%	100%	0%	none	0.00%
109	Colombia	0.2%	98%	0%	none	0.00%
110	Afghanistan	0.2%	96%	0%	none	0.00%
111	Ireland	0.1%	100%	0%	none	0.00%
112	China, Hong Kong SAR	0.1%	100%	0%	none	0.00%
113	Namibia	0.1%	100%	0%	none	0.00%
114	French Polynesia	0.1%	100%	0%	none	0.00%
115	Chile	0.1%	100%	0%	none	0.00%
116	Ecuador	0.1%	100%	0%	none	0.00%
117	Botswana	0.1%	100%	0%	none	0.00%
118	Pakistan	8.1%	1%	0%	none	0.00%
119	Iceland	0.0%	100%	0%	none	0.00%
120	Croatia	0.0%	99%	0%	none	0.00%
121	Uruguay	0.0%	97%	0%	none	0.00%
122	Brazil	0.1%	26%	0%	none	0.00%
123	Uganda	2.1%	1%	0%	none	0.00%
124	Slovenia	0.0%	100%	0%	none	0.00%
125	Serbia	0.0%	11%	0%	none	0.00%
126	Benin	17.0%	–33%	0%	none	0.00%

Source: WITS, FAO, own estimates

TABLE A2.5 **Soybeans**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	Georgia	99.2%	100%	99%	extreme	0.00%
2	Belarus	81.4%	100%	81%	extreme	0.13%
3	Kenya	75.3%	100%	75%	extreme	0.01%
4	Poland	57.9%	100%	58%	extreme	0.03%
5	Moldova	42.3%	100%	42%	extreme	0.00%
6	Greece	41.7%	100%	42%	extreme	0.06%
7	Azerbaijan	35.4%	100%	35%	extreme	0.00%
8	Turkey	31.4%	100%	31%	high	0.40%
9	Sri Lanka	31.4%	100%	31%	high	0.00%
10	Lithuania	23.2%	100%	23%	high	0.00%
11	Hungary	17.4%	100%	17%	high	0.01%
12	Lebanon	17.1%	100%	17%	high	0.01%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
13	Kuwait	14.1%	100%	14%	medium	0.00%
14	Finland	13.1%	100%	13%	medium	0.00%
15	Switzerland	11.9%	100%	12%	medium	0.00%
16	Morocco	7.9%	100%	8%	medium	0.01%
17	USA	7.6%	100%	8%	medium	0.02%
18	Italy	7.4%	100%	7%	medium	0.06%
19	Romania	5.4%	100%	5%	medium	0.00%
20	Iran	5.1%	100%	5%	medium	0.17%
21	Czechia	4.1%	100%	4%	low	0.00%
22	Austria	3.9%	100%	4%	low	0.00%
23	Kyrgyzstan	3.0%	100%	3%	low	0.00%
24	Tajikistan	2.3%	100%	2%	low	0.00%
25	Germany	2.2%	100%	2%	low	0.03%
26	Israel	2.2%	100%	2%	low	0.01%
27	Canada	2.1%	100%	2%	low	0.01%
28	Tunisia	1.9%	100%	2%	low	0.01%
29	Netherlands	1.8%	100%	2%	low	0.04%
30	Spain	1.8%	100%	2%	low	0.03%
31	France	1.6%	100%	2%	low	0.01%
32	Norway	0.7%	100%	1%	none	0.00%
33	Portugal	0.6%	100%	1%	none	0.01%
34	Malaysia	0.5%	100%	1%	none	0.00%
35	Nepal	0.4%	100%	0%	none	0.00%
36	Kazakhstan	0.4%	100%	0%	none	0.00%
37	South Africa	0.3%	100%	0%	none	0.00%
38	India	0.2%	100%	0%	none	0.00%
39	Pakistan	0.1%	100%	0%	none	0.00%
40	Belgium	0.1%	100%	0%	none	0.00%
41	Slovakia	0.1%	100%	0%	none	0.00%
42	China	0.0%	100%	0%	none	0.01%
43	Korea	0.0%	100%	0%	none	0.00%
44	United Kingdom	0.0%	100%	0%	none	0.00%
45	Japan	0.0%	100%	0%	none	0.00%
46	Denmark	0.0%	100%	0%	none	0.00%
47	Costa Rica	0.0%	100%	0%	none	0.00%
48	Thailand	0.0%	100%	0%	none	0.00%
49	Indonesia	0.0%	100%	0%	none	0.00%

Source: WITS, FAO, own estimates

TABLE A2.6 **Poultry**

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
1	Kyrgyzstan	25.3%	73%	18%	high	0.06%
2	Armenia	24.6%	75%	18%	high	0.07%
3	Slovakia	23.1%	61%	14%	medium	0.18%
4	Moldova	50.5%	25%	13%	medium	0.08%
5	Azerbaijan	58.3%	18%	11%	medium	0.15%
6	Georgia	13.5%	76%	10%	medium	0.07%
7	Netherlands	9.0%	100%	9%	medium	0.37%
8	Seychelles	10.4%	85%	9%	medium	0.00%
9	Gambia	9.6%	92%	9%	medium	0.02%
10	Montenegro	13.5%	65%	9%	medium	0.01%
11	Mauritania	8.0%	86%	7%	medium	0.02%
12	Central African Republic	7.7%	43%	3%	low	0.00%
13	Namibia	3.3%	100%	3%	low	0.01%
14	United Arab Emirates	3.3%	97%	3%	low	0.16%
15	Maldives	2.8%	100%	3%	low	0.00%
16	Kazakhstan	5.4%	50%	3%	low	0.09%
17	Guinea	3.3%	73%	2%	low	0.01%
18	Congo	2.5%	93%	2%	low	0.02%
19	Saudi Arabia	4.4%	52%	2%	low	0.26%
20	North Macedonia	2.2%	97%	2%	low	0.01%
21	Uzbekistan	10.2%	20%	2%	low	0.02%
22	Estonia	3.7%	55%	2%	low	0.01%
23	Zambia	8.6%	23%	2%	low	0.02%
24	Comoros	2.0%	96%	2%	low	0.01%
25	DR Congo	1.9%	90%	2%	low	0.02%
26	Belarus	34.5%	4%	2%	low	0.03%
27	Jordan	4.3%	24%	1%	low	0.03%
28	Czechia	2.6%	38%	1%	low	0.02%
29	Kuwait	1.4%	71%	1%	none	0.02%
30	Cabo Verde	1.0%	93%	1%	none	0.00%
31	Oman	0.8%	100%	1%	none	0.01%
32	Germany	1.8%	39%	1%	none	0.10%
33	Romania	3.1%	21%	1%	none	0.03%
34	Poland	21.0%	3%	1%	none	0.11%
35	Albania	1.1%	59%	1%	none	0.00%
36	Qatar	0.6%	85%	1%	none	0.01%
37	Bahrain	0.6%	82%	0%	none	0.00%
38	Sudan	36.3%	1%	0%	none	0.00%
39	Egypt	8.1%	5%	0%	none	0.06%
40	Tajikistan	0.5%	70%	0%	none	0.00%
41	Ghana	0.5%	73%	0%	none	0.01%
42	China, Hong Kong SAR	0.3%	100%	0%	none	0.02%
43	Togo	0.9%	31%	0%	none	0.00%
44	Sierra Leone	0.5%	53%	0%	none	0.00%
45	Benin	0.3%	90%	0%	none	0.00%
46	Cyprus	0.7%	29%	0%	none	0.00%

	Partner	Share of imports from Ukraine in total imports, 2016–2020 average	Share of imports in domestic supply, 2016–2020 average	Domestic market vulnerability	Level of domestic market vulnerability	Global vulnerability
47	Switzerland	0.7%	26%	0%	none	0.00%
48	Yemen	0.5%	36%	0%	none	0.00%
49	Ireland	0.3%	54%	0%	none	0.00%
50	Ethiopia	36.9%	0%	0%	none	0.00%
51	Lebanon	2.8%	5%	0%	none	0.00%
52	Viet Nam	0.8%	14%	0%	none	0.01%
53	Slovenia	0.5%	22%	0%	none	0.00%
54	Turkey	10.3%	1%	0%	none	0.04%
55	Singapore	0.2%	65%	0%	none	0.00%
56	Côte d'Ivoire	6.3%	1%	0%	none	0.00%
57	Angola	0.1%	85%	0%	none	0.00%
58	Mozambique	0.5%	20%	0%	none	0.00%
59	Niger	0.7%	14%	0%	none	0.00%
60	France	0.2%	30%	0%	none	0.01%
61	Austria	0.2%	37%	0%	none	0.00%
62	Uganda	13.1%	0%	0%	none	0.00%
63	Mali	5.1%	1%	0%	none	0.00%
64	Spain	0.4%	8%	0%	none	0.01%
65	Belgium	0.0%	100%	0%	none	0.00%
66	Luxembourg	0.0%	100%	0%	none	0.00%
67	Malta	0.0%	58%	0%	none	0.00%
68	Hungary	0.1%	14%	0%	none	0.00%
69	Finland	0.4%	4%	0%	none	0.00%
70	Italy	0.2%	5%	0%	none	0.00%
71	United Kingdom	0.0%	21%	0%	none	0.00%
72	Greece	0.0%	19%	0%	none	0.00%
73	Denmark	0.0%	28%	0%	none	0.00%
74	Thailand	0.7%	0%	0%	none	0.00%
75	China, Macao SAR	0.0%	85%	0%	none	0.00%
76	Malaysia	0.0%	4%	0%	none	0.00%
77	Mauritius	0.1%	0%	0%	none	0.00%
78	Norway	0.0%	1%	0%	none	0.00%
79	Belize	0.1%	0%	0%	none	0.00%
80	China	0.0%	10%	0%	none	0.00%

Source: WITS, FAO, own estimates

Annex 3 The composite index of countries' domestic market vulnerabilities

TABLE A3.1 **The composite index of countries' domestic market vulnerabilities**

	Area	Number of products imported (min = 1, max = 6)	Number of extreme vulnerability cases (min = 1, max = 6)	Number of high vulnerability cases (min = 1, max = 6)	Number of medium vulnerability cases (min = 1, max = 6)	Number of low vulnerability cases (min = 1, max = 6)	Number of no vulnerability cases (min = 1, max = 6)	Composite index
1	Lebanon	6	2	3			1	425
2	Tunisia	5	2	1	1	1		350
3	Sri Lanka	5	2	1		2		325
4	Netherlands	6	2		1	2	1	300
5	Israel	5		2	2	1		275
6	Qatar	5	1	1	2		1	275
7	Lithuania	4	2	1			1	275
8	Spain	6	1	1		3	1	250
9	Cyprus	5		3		1	1	250
10	Jordan	5	1		2	2		250
11	Kenya	4	2		1		1	250
12	Belarus	6	1	1		2	2	225
13	Georgia	6	1		2	1	2	225
14	Greece	6	1		1	3	1	225
15	Italy	6	1		2	1	2	225
16	Poland	6	2			1	3	225
17	Moldova	6	1	1	1		3	225
18	Turkey	6		1	2	2	1	225
19	Egypt	5		2	1	1	1	225
20	Morocco	5		1	2	2		225
21	Malaysia	6	1		2		3	200
22	Oman	5	1		1	2	1	200
23	Korea	5		2	1		2	200
24	Saudi Arabia	5	1	1		1	2	200
25	United Arab Emirates	5	1			4		200
26	Estonia	3	1	1		1		200
27	Kuwait	6			3	1	2	175
28	China	5	1		1	1	2	175
29	Iran	5		1	2		2	175
30	Algeria	4	1		1	1	1	175
31	Mauritania	3		1	2			175
32	Guyana	2	1	1				175
33	Azerbaijan	6	1		1		4	150

	Area	Number of products imported (min = 1, max = 6)	Number of extreme vulnerability cases (min = 1, max = 6)	Number of high vulnerability cases (min = 1, max = 6)	Number of medium vulnerability cases (min = 1, max = 6)	Number of low vulnerability cases (min = 1, max = 6)	Number of no vulnerability cases (min = 1, max = 6)	Composite index
34	Germany	6		1	1	1	3	150
35	United Kingdom	6		2			4	150
36	Portugal	5		1	1	1	2	150
37	Norway	6		1	1		4	125
38	Thailand	5		1	1		3	125
39	Côte d'Ivoire	4	1			1	2	125
40	Finland	4		1	1		2	125
41	Malta	4		1	1		2	125
42	Latvia	3		1	1		1	125
43	Palestine	3	1			1	1	125
44	Philippines	3		1	1		1	125
45	Senegal	3		1	1		1	125
46	Seychelles	3			2	1		125
47	Guinea	2	1			1		125
48	France	6		1		1	4	100
49	Hungary	6		1		1	4	100
50	Bahrain	5			2		3	100
51	Czechia	5			1	2	2	100
52	India	5	1				4	100
53	Slovakia	5			2		3	100
54	Viet Nam	5		1		1	3	100
55	Angola	4		1		1	2	100
56	Armenia	4		1		1	2	100
57	Indonesia	4		1		1	2	100
58	Kyrgyzstan	4		1		1	2	100
59	Nepal	4	1				3	100
60	USA	4			2		2	100
61	Costa Rica	3	1				2	100
62	Ghana	3	1				2	100
63	Myanmar	3			1	2		100
64	Yemen	3		1		1	1	100
65	Congo	2		1		1		100
66	Togo	2	1				1	100
67	Austria	6			1	1	4	75
68	Denmark	6		1			5	75
69	Romania	6			1	1	4	75
70	Belgium	5		1			4	75
71	Pakistan	5			1	1	3	75
72	Ireland	4		1			3	75
73	Sudan	4		1			3	75
74	Albania	3			1	1	1	75
75	Canada	3			1	1	1	75
76	DR Congo	3				3		75
77	Ethiopia	3			1	1	1	75
78	Mozambique	3			1	1	1	75

	Area	Number of products imported (min = 1, max = 6)	Number of extreme vulnerability cases (min = 1, max = 6)	Number of high vulnerability cases (min = 1, max = 6)	Number of medium vulnerability cases (min = 1, max = 6)	Number of low vulnerability cases (min = 1, max = 6)	Number of no vulnerability cases (min = 1, max = 6)	Composite index
79	New Zealand	3		1			2	75
80	Sierra Leone	3		1			2	75
81	Comoros	2			1	1		75
82	Gambia	2			1	1		75
83	Niger	2		1			1	75
84	Singapore	2		1			1	75
85	Australia	1		1				75
86	Switzerland	6			1		5	50
87	Japan	5				2	3	50
88	South Africa	5				2	3	50
89	Bulgaria	3			1		2	50
90	Montenegro	3			1		2	50
91	Uganda	3			1		2	50
92	Burkina Faso	2			1		1	50
93	Madagascar	2			1		1	50
94	Mali	2			1		1	50
95	Mauritius	2			1		1	50
96	Sweden	2				2		50
97	Dominican Republic	1			1			50
98	El Salvador	1			1			50
99	Fiji	1			1			50
100	Grenada	1			1			50
101	Panama	1			1			50
102	Peru	1			1			50
103	Rwanda	1			1			50
104	Zimbabwe	1			1			50
105	Kazakhstan	5				1	4	25
106	Tajikistan	3				1	2	25
107	Uzbekistan	3				1	2	25
108	Burundi	2				1	1	25
109	Cambodia	2				1	1	25
110	Ecuador	2				1	1	25
111	Malawi	2				1	1	25
112	Maldives	2				1	1	25
113	Namibia	2				1	1	25
114	Nigeria	2				1	1	25
115	Barbados	1				1		25
116	Central African Republic	1				1		25
117	Mexico	1				1		25
118	Mongolia	1				1		25
119	North Macedonia	1				1		25
120	Zambia	1				1		25
121	Russian Federation	4					4	0
122	Benin	3					3	0

	Area	Number of products imported (min = 1, max = 6)	Number of extreme vulnerability cases (min = 1, max = 6)	Number of high vulnerability cases (min = 1, max = 6)	Number of medium vulnerability cases (min = 1, max = 6)	Number of low vulnerability cases (min = 1, max = 6)	Number of no vulnerability cases (min = 1, max = 6)	Composite index
123	Bosnia and Herzegovina	3					3	0
124	Serbia	3					3	0
125	Slovenia	3					3	0
126	Botswana	2					2	0
127	Chile	2					2	0
128	China, Hong Kong SAR	2					2	0
129	French Polynesia	2					2	0
130	Iceland	2					2	0
131	Luxembourg	2					2	0
132	Afghanistan	1					1	0
133	Belize	1					1	0
134	Brazil	1					1	0
135	Cabo Verde	1					1	0
136	China, Macao SAR	1					1	0
137	Colombia	1					1	0
138	Croatia	1					1	0
139	Eswatini	1					1	0
140	Guatemala	1					1	0
141	Uruguay	1					1	0

Source: WITS, FAO, own estimates

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