

# War in Ukraine and the challenge to global food security

**Russia's invasion is the latest threat to the stability of world food supplies. Researchers can help stop the cycle of repeated food crises.**

**A**n invasion. A war. A pandemic. A financial crisis. All have conspired to put unprecedented stress on global food systems. Ukraine and Russia produce a combined total of 14% of the world's wheat and 30% of the world's wheat exports, as well as 60% of the world's sunflower oil. These supplies are under threat, with Russia suspending food and fertilizer exports, and Ukraine's farmers under extreme stress, fighting an invading army while tending to this year's crop.

And Russia is not alone in limiting its exports. According to Rob Vos at the International Food Policy Research Institute, based in Washington DC, by 12 April, a total of 16 countries had banned or restricted food exports. This marked reduction in supply is fuelling inflation. Taken together, the impacts could be catastrophic for some of the world's poorest and most vulnerable people. At least 26 countries, including Somalia, Senegal and Egypt, rely on one or both of Russia and Ukraine for between 50% and 100% of their wheat. If the war continues, many countries already saddled with pandemic debt could be forced to borrow more to subsidize staple foods, creating more hardship.

Clearly, action must be taken now. Priorities must include preventing and rolling back export bans, and funding the World Food Programme's emergency-relief efforts. The agency said last month that, because of inflation, it needs to find an extra US\$60 million to \$75 million a month.

## Schools of thought

The diagnosis might be clear, but there's less consensus on what needs to be done in the medium-to-long term to increase nations' resilience to the hunger that follows pandemics, wars and extreme weather. Food-systems science is complex, with many perspectives, and there are gaps in the research. There is also no intergovernmental mechanism through which governments, having been informed by research advice, are bound to act on food systems.

According to one school of thought, every policy lever must be applied to reduce countries' dependence on food imports – even if that means choosing options that might not be the most environmentally sound. It could mean, for example, felling forests so that more cereal and oil crops can be grown closer to home markets.

A second school of thought argues that the crisis presents a chance to speed up moves towards a more

environmentally conscious future. Intensive agriculture is the leading cause of biodiversity loss and, globally, farming contributes 30% of all greenhouse-gas emissions. At least four policies could minimize these impacts, while at the same time securing food supplies, say proponents.

First, around one-third of global croplands produce animal feed, according to the World Resources Institute, an environmental think tank based in Washington DC. Humans could meet their energy needs using a lot less land if they ate fewer animal products. Second, one-third of all food produced globally never reaches the plate – it is lost in the production chain or wasted once it reaches households. Improvements in harvesting and storage methods could potentially reduce losses, as might efforts to nudge consumers to make more responsible choices.

Third, most land under cultivation is occupied by a small number of food crops, such as wheat, rice, maize (corn), soya and potatoes. This contributes to biodiversity loss. Diversifying agriculture to include more legumes, nuts and vegetables would benefit both the planet and people, because these crops provide important nutrients.

Finally, croplands that are currently being used to grow biofuels could be converted back to growing food crops. In the United States, some 40% of maize is used to make ethanol. Research shows that biofuels grown on croplands are not as useful in climate mitigation as once thought<sup>1</sup>.

## The research challenge

Each of these measures will have associated costs, and the trade-offs must be assessed, which is why research is crucial. Some areas of this research are patchy. An analysis of published agricultural science (a project called Ceres2030) found that less than 5% was relevant to the needs of small-holder farmers (see [go.nature.com/3rjkwiv](http://go.nature.com/3rjkwiv)). Moreover, the major funders of agricultural research overwhelmingly finance research into the staple cereal crops<sup>2</sup>. Esther Turnhout, chair of science, technology and society at the University of Twente in the Netherlands, says: "Something is going wrong here in how we understand food systems, and part of the problem lies in how we do research into food systems."

At a key United Nations summit last year, delegates discussed the idea of establishing a body akin to the Intergovernmental Panel on Climate Change (IPCC) for food systems. It would respond to questions from policymakers and produce advice based on a synthesis of the available evidence. Its reports would also remind funders of gaps in the science that need addressing.

But the idea has its detractors, who rightly point out that the food-systems field does not lack high-level panels of scientists producing research evidence. At least 11 such panels<sup>3</sup> have a remit that covers this; these include the high-level panel of experts of the Committee on World Food Security, which provides ongoing science advice to the UN system.

What food systems lacks is an intergovernmental mechanism by which policymakers are given independent assessments of the literature and commit to acting on these findings, in the way that the IPCC's reports inform the work of governments meeting at UN climate conventions.

The feasibility of the IPCC-style panel for food systems is

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being researched by an expert group reporting to the European Commission in Brussels. Its recommendations, due to be published this summer, are expected to confirm that existing organizations are not delivering what is needed. But the solution, says one group member, environmental scientist Jacqueline McGlade, is not necessarily a new IPCC-style body. Instead, the group is expected to recommend a greater effort to gather knowledge and evidence from under-represented groups. In addition, a UN 'clearing house' could extract what governments need from existing science-advice panels and embed these recommendations in global commitments such as those on climate change, biodiversity and the UN Sustainable Development Goals.

Whether the expert group persuades enough people and organizations to come together to improve the breadth and clout of food-systems science advice remains to be seen. But the analysis and soul-searching along the way will be productive. The latest crisis should be seen as the moment when the world came together to renovate the food system and the research agenda behind it. As Sheryl Hendriks, a food-policy researcher at the University of Pretoria, says: "The geopolitics are more clear than we've ever, ever imagined."

1. Jeswani, H. K., Chilvers, A. & Azapagic, A. *Proc. R. Soc. A* **476**, 20200351 (2020).
2. Pingali, P. *Food Sec.* **7**, 583–591 (2015).
3. Singh, B. K. et al. *Nature Food* **2**, 838–842 (2021).

## Global science must stand up for Iran's imprisoned scholars

**Iranian researchers are at risk as never before. Governments are urging quiet diplomacy – but public campaigns matter.**

**F**or an all-too-brief period last month, it seemed that Morad Tahbaz, co-founder of conservation charity the Persian Wildlife Heritage Foundation in Tehran, might be free to go home after four years as a prisoner in Iran. Tahbaz's charity had been monitoring the critically endangered Asiatic cheetah (*Acinonyx jubatus venaticus*) by laying camera traps. Iran's judicial system decreed that this was spying – and Tahbaz, with seven colleagues, is serving a ten-year jail sentence. The charity's other co-founder, sociologist Kavous Seyed Emami, died in prison just weeks after his arrest.

Tahbaz has Iranian, UK and US citizenship. He was initially freed as part of a deal involving two UK–Iranian citizens, charity worker Nazanin Zaghari-Ratcliffe and engineer Anoosheh Ashoori. The latter two were swiftly put on aeroplanes to the United Kingdom, but Tahbaz was returned

to prison. His family is in shock and disbelief.

Tahbaz is one in a lengthening list of people involved in scientific activities who are being jailed in Iran for spying. Their plight is all the more precarious because there's little publicity about the charges against them or the horrendous conditions in which they're kept. Those arrested include dual nationals, such as Swedish–Iranian Ahmadreza Djalali, who studies how to make hospitals disaster-proof and is facing a death sentence; and Fariba Adelkhah, a French–Iranian anthropologist working at Sciences Po in Paris, who was arrested and imprisoned in 2019.

One reason dual nationals are arrested is to be used as hostages to extract concessions from Western governments. But the majority of scholars in prison are Iranian nationals and their stories are not well known. They include Niloufar Bayani, a wildlife conservationist formerly with the United Nations. Younger people have been caught up, too, such as Ali Younesi, an award-winning computer-science student at Sharif University of Technology in Tehran.

A new book, *The Uncaged Sky*, by anthropologist Kylie Moore-Gilbert lays bare the severe mental and physical punishments they are enduring – especially women. Moore-Gilbert, who has dual UK and Australian citizenship, is uniquely placed to write this account. Formerly at the University of Melbourne in Australia, she travelled to Iran in 2018 to attend a conference and was arrested at the airport as she was preparing to return to Australia. She was imprisoned for two years on spying charges before being released last year as part of a prisoner swap.

Moore-Gilbert spent time with both Bayani and Adelkhah at the notorious Evin Prison in Tehran. She describes in vivid detail how women undergo interrogation and torture, how they are sexually harassed, forced to spend periods in solitary confinement and denied basic medical care. It's a means of breaking them so they will confess to things they did not do.

The importance of publicity is an overriding message. Moore-Gilbert's family in Australia was advised by its government not to go public about her case, because this could complicate negotiations for her release. But those who avoid publicity become a lower priority for their governments. Moore-Gilbert recalls a phone call with her father in which he said the government was advising staying quiet. In response, she said, "Dad, listen to me – I don't have much time. You need to go to the media. Tell them what's happening to me. Tell them I've been arrested and that I'm being kept in solitary and denied visits from the embassy."

Hostage taking can be countered if governments speak with one voice, instead of each dealing bilaterally with Iran. And constant publicity is one of the best ways to put pressure on all sides to act.

The scientific community must do more to raise its voice in support of jailed scholars. International scientists should speak out for Iranian colleagues who don't benefit from the freedom of speech that they do. Statements, letters – and even mentioning Iran's imprisoned researchers at conferences and events – are ways to tell Iranian scholars that global science stands with them. Iranian science will not flourish until its scholars feel safe.

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