Viewpoint: How biotechnology can make geopolitical food security upheavals less likely — Ukrainian War prompts global rethink about Europe's reliance on 'obsolete technologies'



elebrated in <u>symphonies</u>, and storied in <u>literature</u> and <u>cinema</u>, the steppes of central Asia have long played a key role in the history of western civilization. Early inhabitants domesticated the horse, first for meat, then for riding and hauling; they developed the wheel, harnessing it for daily life, trade, and warfare, and gave us the Indo-European languages that underpin our

cultures and drive our economies. They also played a central role in developing and harnessing wild grasses: wheat, barley, and rye that allowed for easy accumulation of food surpluses, enabling specialization, the <u>essential prerequisite</u> to civilization, and the experience of food security as something more than ephemeral good luck.



Simpler times. Credit: Astrokey44

Now these steppes feature in the <u>daily news</u> covering <u>Russia's</u> <u>criminal</u> (and, happily, <u>failing</u>) attempt to <u>conquer</u> Ukraine. The moral outlines of the conflict are clear, and <u>completely unsurprising</u> to anyone who's <u>paid attention</u> to international politics in recent decades. But Putin's apocalypse will have far-reaching impacts that threaten the whole world even if the nuclear nightmare is avoided.

The global distribution of food security is uneven. <u>Food reserves</u> have been <u>tightening</u> in recent years, and with <u>more than a quarter</u> of the world's wheat coming from Ukraine and Russia the prospects for severe <u>disruption</u> to global food supplies grows with each day Putin's doomed, delusional misadventurecontinues. Although Ukrainian farmers <u>continue to plant</u> as they are able, <u>about a third</u> of their land isprojected to lie <u>fallow</u> this year. The <u>capacity</u> of other countries to make up the difference is imperfect.



Yam market in Nigeria. African nations will have to foster self sufficiency to endure global disruption. Credit: Guardian

As *The Economist* has noted, "The war in Ukraine is going to <u>change geopolitics profoundly</u>. Some bits will look familiar, some will look unprecedented." Food prices are already rising <u>in many countries</u>: Livestock husbandry in <u>Kenya</u> is suffering as rising animal feed costs ripple through the economy, triggering widespread price increases; Tunisia, where food price spikes spawned the <u>Arab Spring</u> a decade ago, is seeing prices <u>soar</u> for wheat, fuel, and fertilizer imports; Brazil and Peru anticipate <u>major disruptions</u> due to fertilizer <u>shortages</u>; Indonesia <u>has banned</u> palm oil exports; and other forces converge and cascade to magnify negative impacts, all exacerbated by <u>ill-considered policies</u> of <u>various flavors</u>.

Follow the latest news and policy debates on sustainable agriculture, biomedicine, and other 'disruptive' innovations. Subscribe to our newsletter. SIGN UP

Not all food price increases are from Putin's war. Drought, bird flu, and other factors contribute, along with

pandemic supply chain <u>disruptions</u>. The consequence is that Russian aggression in Ukraine means " hunger will haunt the world." What is to be done?



Angolans clear away minefields from a war decades past to make room for farmland and roads. How long will it take to clear away the wreckage of the present conflict? Credit: Antonio Olmos

The United Nations has <u>made the case</u> that global agriculture requires a profound reshaping to meet the challenges of climate change and food security in the 21st century. We have seen <u>success</u> from such reform efforts before, despite <u>misguided opposition</u>. And recent increases in our <u>understanding</u> of biology have given us the most <u>powerful tools</u> we've ever had to address the challenges we face. But the solutions they bring are impeded by a political obstacle: <u>regulatory policies</u> driven by fear rather than informed by science and experience.

New biological tools make it possible more effectively to harness underutilized resources like <u>orphan crops</u>, and farmers are <u>increasing their demands</u> for access to modern tools that can provide <u>some buffering</u> from geopolitical turmoil. Important voices in areas long hostile to genetically engineered crops are increasingly <u>shifting</u> from opposition to <u>embrace</u>, as past <u>worries have been laid to rest</u> by data and experience.



The (Left) kiwiberry and (Right) groundcherry are two less common crops that could benefit from gene editing. Credit: (Left) Hale Lab, (Right) Getty Images

Genetic engineering has already delivered <u>vast</u> <u>economic</u> and <u>environmental</u> benefits to humanity. Gene editing is rapidly <u>expanding</u> those <u>contributions</u>, with some even <u>recognizing</u> new biotechnologies are key to future sustainability.

Researchers have discovered crop yields can be increased by 10 percent by using CRISPR gene editing simply to <u>silence a single gene</u>. We've already seen gene editing used to improve the nutrient content of <u>fruit</u>, with new products already on the market and the pipeline <u>bulging</u> with more. These new products improve the <u>economic outlook</u> for farmers, but are also poised to improve the <u>sustainability</u> of their farming, <u>cutting fertilizer use</u>, pesticides, and helping against climate change by increasing the <u>carbon</u> they sequester. It has now become possible to <u>improve photosynthesis itself</u>, and make <u>trees</u> far more effective at sequestering carbon. Indeed, it is clear that not only are the opportunities almost limitless, but that the technology is the greenest thing going.



Food supplies will experience the effects of climate change long before the icecaps melt. Credit: Shutterstock

All of this is threatened by government regulations that are ostensibly aimed at enhancing safety but which in fact do little but perpetuate reliance on obsolete technologies. The measures imposed by these regulations violate widely accepted <u>bedrock principles</u> that they should be proportional to the hazards they aim to mitigate, and no more onerous than required to meet the goal. Restoring the primacy of these principles to regulation, through <u>steps</u> ITIF has <u>outlined</u>, would go a long way toward unleashing their innovative potential. Not only would this help make famine from geopolitical upheavals less likely, it promises <u>longer</u>, richer lives to the entire world. The <u>sky</u> is the limit.

Val Giddings received his Ph.D. in genetics and evolutionary biology from the University of Hawaii. Val is also president/CEO of PrometheusAB, Inc, and senior fellow at the Information Technology and Innovation Foundation. You can follow Val on Twitter @prometheusgreen

A version of this article was posted at <u>Information Technology and Innovation Foundation</u> and is used here with permission. Check out Information Technology and Innovation Foundation on Twitter <u>@ITIFdc</u>