

The Opinion Pages | Op-Ed Contributor

Extreme Weather and Food Shocks

By TIM BENTON and ROB BAILEYSEPT. 8, 2015

[Continue reading the main story](#) [Share This Page](#)

[Share](#)

[Tweet](#)

[Email](#)

[More](#)

[Save](#)

[Photo](#)

Credit Sam Brewster

Recent events highlight concerns about the risks to global food security posed by changing patterns of extreme weather affecting the world's "breadbasket" regions such as the American Midwest, South America's southern cone, the Black Sea and the Yangtze River valley. In 2012, the worst drought to hit the U.S. Midwest in half a century sent international maize and soybean prices to record levels. In 2011, wheat prices nearly doubled after an unprecedented heat wave devastated the Russian harvest. The global food price crisis of 2007-8 had its roots in a run of poor harvests in previous years.

Global food security largely depends on the production of a few "mega-crops" in the breadbasket regions: maize, wheat, rice and soybeans. On the whole, the system works well. International trade provides a global market for these specialized production centers, reducing the cost of food for billions of people by allowing agriculture to flourish where it can be most efficient. Trade also allows countries to meet unforeseen production shortfalls through imports, as Britain did in the summer of 2013 after floods spoiled the winter wheat harvest. But when extreme weather ruins the harvest in a breadbasket region, that's not just a problem in the country affected, it's a problem for all importing countries.

Of course the risk to the world's food security doesn't arise simply from bouts of bad weather. Weather's impact can be compounded by the actions of governments and markets. Governments can make things much worse when, for example, they try to shore up domestic food supplies by banning or limiting agricultural exports, further pushing up international prices. The 2007-8 crisis saw over 30 governments impose export restrictions in a spiral of rising prices and collapsing market confidence; the 2011 wheat spike was amplified when Russia turned off exports.

Likewise it is becoming clear that severe weather shocks rippling through the food system can ignite wider instability. During the 2007-8 crisis, protests erupted in 61 countries and turned violent in 23. In the wake of the Russian heat wave, the price of bread was one of several grievances behind the Arab Spring. Once shocks to the food system spill over into other areas, they can cascade through economic and political systems with sometimes devastating consequences.

Continue reading the main story

ADVERTISEMENT

Continue reading the main story

Amid these pressures, the global food system is coming under increasing strain, as highlighted in a recent report that we wrote in conjunction with other British and American experts for the U.K.-led Global Food Security program. Rising incomes and changing dietary preferences mean demand for food is growing faster than cereal yields. Water scarcity and soil depletion present challenges for agriculture, which faces sharper competition for resources from urbanization and energy production. A precarious supply-and-demand balance means the system is easily unbalanced.

The stability of the global food system faces risks from the increasingly frequent extreme weather that is being driven by climate change. For example, in the United States there were more than four times more weather events causing damage in excess of \$1 billion (in 2011 prices) in 2007-11 than in 1980-85. Drought is a particularly powerful driver of global food shocks. Two episodes stand out: in 1988-9, when maize and soybean were seriously affected in the U.S. Midwest, and in 2002-3, when rice and wheat were hit in Eastern Europe and Western Asia.

Were these two events to happen in the same year — a multiple breadbasket failure — it would result in the loss of between 5 and 10 percent of the production of these

major crops, more than enough to supply the basic calorie needs of the United States for a year. Until recently, such a calamity would have been expected every 100 to 200 years, but this number is shrinking rapidly due to climate change. An initial analysis of recent data suggests that the risk of a 1-in-100-year event during the second half of the last century is likely to increase to 1-in-30 years by 2040 — and perhaps even 1-in-15 years in the decades after 2050.

A multiple failure in the world's breadbaskets in the same year is, in our view, a plausible worst-case scenario for today. In fact, by the end of the century such an event may occur every few years unless we reduce emissions overall, and we change what we grow, and how we grow it, to adapt to the changing climate. Such a crisis would almost certainly be compounded by export restrictions, panic buying and hoarding, driving food prices to new heights.

[Newsletter Sign Up](#)

[Continue reading the main story](#)

[Opinion Today](#)

Every weekday, get thought-provoking commentary from Op-Ed columnists, The Times editorial board and contributing writers from around the world.

Receive occasional updates and special offers for The New York Times's products and services.

[See Sample](#)

[Privacy Policy](#)

This would be particularly serious for the food-importing countries of the developing world, especially in Sub-Saharan Africa. The shock would come at the economic level, in the form of inflation, balance-of-payment difficulties and budgetary pressures, and it would strike at the human level in increasing poverty; in the developed economies, consumers would feel the pinch as grocery prices climbed. Of even more concern, however, would be the spread of the crisis from food markets to political systems in the world's geopolitical hotspots; fragile countries could be

destabilized, especially the major grain importers of the Middle East and North Africa.

Given these predictions and warnings, what needs to be done?

Agriculture must of course be adapted to a dramatically changing climate: We need to reverse declines in yield growth. This requires significantly more research and development investment to increase maximum attainable yields and to expand agricultural extension services. Additional investment is needed to reduce the environmental impact of farming and to bolster its ability to withstand climate change.

In addition, vulnerable countries can shore up their food security through policy measures to insulate their populations from market shocks. Such efforts include holding strategic stocks, raising national production to reduce import dependency and improve self-sufficiency, and “buying forward” to lock in future import prices.

The greatest challenge will be to make the global food system far more resilient. Rules limiting the use of export barriers will become vital if a functional trading system is to be maintained. Biofuel policies will also need to be reformed by making mandates flexible, so that biofuel use falls when food prices rise, or by limiting the use of staple food crops in biofuel production when food demand outstrips supply.

Recent multilateral efforts to improve the quality and availability of key market data, such as food stock levels, can help governments anticipate crises and avoid panic. But improved climate and economic modeling is needed to understand the risks and assess how best to manage them. Armed with this knowledge, governments, international organizations and businesses could engage in contingency planning, set up early-warning systems, and coordinate the management of strategic stocks.

International food shocks exacerbated by extreme weather events can affect millions of people in countries around the world. Taking smart and practical steps to ease the impact of our changing climate on our food supplies is vital if we are to ride out the droughts and storms that will impact our food prices.

Tim Benton is the academic director of the Global Security Program and a professor of population ecology at the University of Leeds. Rob Bailey is the research director for Energy, Environment and Resources at Chatham House.