CQ Global Researcher
Exploring International Perspectives

OCT. 18, 2011 VOLUME 5, NUMBER 20 PAGES 499-524 WWW.GLOBALRESEARCHER.COM

Rising Food Prices

ARE HIGH FOOD PRICES HERE TO STAY?

Global food prices reached record highs early this year, sending millions around the world into poverty and contributing to starvation in East Africa. Many blame the government-subsidized growth in the market for biofuels, such as ethanol. Biofuels are expected to consume 40 percent of this year's corn crop from the world's largest producer — the United States. Others say commodities speculators caused food prices to ricochet wildly. Europe is considering adopting restrictions on speculation similar to a new U.S. law, but Wall Street is lobbying hard to weaken the American regulations. Perennially high food prices may be the first sign that changing climate is handicapping agriculture. To feed the world's growing population, experts say farmers must double their food output by mid-century — a tall order to fill without destroying more rain forests and further boosting planet-warming carbon emissions. The solution may be a combination of two warring philosophies: high-tech agriculture and traditional farming methods that are kinder to the environment.

Protesters carry a man waving a baguette in Tunis, Tunisia, on Jan. 18, 2011. Anger over rising food prices mobilized many of the thousands of people who took to the streets in Tunisia, Egypt and elsewhere in the Middle East during the "Arab Spring."

PUBLISHED BY CQ PRESS, AN IMPRINT OF SAGE PUBLICATIONS, INC. WWW.CQPRESS.COM

Rising Food Prices

CQ Global Researcher
Exploring International Perspectives

Oct. 18, 2011
Volume 5, Number 20

Managing Editor: Kathy Koch
kkoch@cqpress.com

Contributing Editors: Thomas J. Billitteri
tjb@cqpress.com; Thomas J. Colin
tcolin@cqpress.com

Contributing Writers: Brian Beary, Roland Flamini, Sarah Glazer, Reed Karaim, Robert Kiener, Jina Moore, Jennifer Weeks

Design/Production Editor: Olu B. Davis

Assistant Editor: Darrell Dela Rosa

Fact Checker: Michelle Harris

SAGE | CQ PRESS

Los Angeles | London | New Delhi
Singapore | Washington DC

An Imprint of SAGE Publications, Inc.

Vice President and Editorial Director:
Jayne Marks

Director, Online Publishing:
Todd Baldwin

CQ Global Researcher is published twice monthly online in PDF and HTML format by CQ Press, an Imprint of SAGE Publications. Annual full-service electronic subscriptions start at $500. For pricing, call 1-800-834-9020, ext. 1906. To purchase *CQ Global Researcher* electronic rights, visit www.cqpress.com or call 866-427-7737.

Cover: AFP/Getty Images/Martin Bureau

Rising Food Prices

By Sarah Glazer

The Issues

Last December a 26-year-old Tunisian who dreamed of saving enough money to buy a car went into the street to sell vegetables and fruit from his cart in the dusty town of Sidi Bouzid. Although he was accustomed to being bullied by police, he couldn't take it anymore after a policewoman confiscated his produce, slapped him, spat at him and insulted his dead father.

In protest, Mohammed Bouazizi went to the municipal government building on Dec. 17 and set himself on fire — an immolation that set off a chain of angry street protests that spread across the Arab world. [1]

To Rami Zurayk, an agronomy professor at the University of Beirut, it was no coincidence that the so-called Arab Spring began in a rural area where a drought and scarce water are making it harder for farmers to make a living. Frustrated young men with no prospects in farming set out for better opportunities in the cities, only to find no work and high food prices — since more than half of the food in the Middle East and North Africa is imported. [2]

"Although the Arab revolutions were united under the slogan 'the people want to bring down the regime' not 'the people want more bread,' food was a catalyst," according to Zurayk. [3] "I think that the prices of food mobilized people." [4]

As protests engulfed one Arab country after another in the ensuing months, a widely photographed demonstrator in the Yemeni capital of Sanaa showed up with baguettes and an uncooked chapatti taped to his forehead. In Egypt, Tunisia and Yemen, demonstrators carried pots and pans and brandished baguettes to protest high food prices.

Getty Images/John Gress

Traders signal their orders in the "wheat pit" at Chicago's Mercantile Exchange, which sets global prices for the world's four major grains — wheat, corn, rice and soybeans. Some economists blame commodities speculators and the rising demand for biofuels for rising food prices. Others blame poor weather, an imbalance between supply and demand and low surplus stocks.

While most Western accounts described the demonstrations as political protests against authoritarian governments, economists pointed out that rising food prices coupled with high unemployment helped ignite already-smoldering discontent. Many pointed to a chain of events that began with Russia's worst drought in a century in the summer of 2010, killing one-third of the wheat crop and leading the government to ban wheat exports to keep domestic food prices down. [5]

Shortly after the export ban, bread prices surged in Egypt, Russia's biggest wheat customer and one of the world's largest food importers. Egypt was forced to import higher-priced wheat from the United States, putting financial pressure on already-strapped Egyptian families, who typically spend about 40 percent of their income on food (compared to less than 10 percent in U.S. households). [6]

Frustrated by high food prices, unemployment and repressive governments, young Egyptians gathered to protest in Cairo's Tahrir Square in late January, joining the chain of protests that had begun in Tunisia. In Algeria, protests that broke out in late December were a direct response to record prices for bread, milk and sugar and high unemployment. By the time the so-called Arab Spring protests ended in Tunisia, Egypt and Libya, the leaders of those countries had been deposed or were on the run. [7]

"The kind of prices we have can only contribute to more political instability and problems in countries that are poor and import food," says Abdolreza Abbassian, senior grains economist at the U.N. Food and Agriculture Organization (FAO) in Rome.

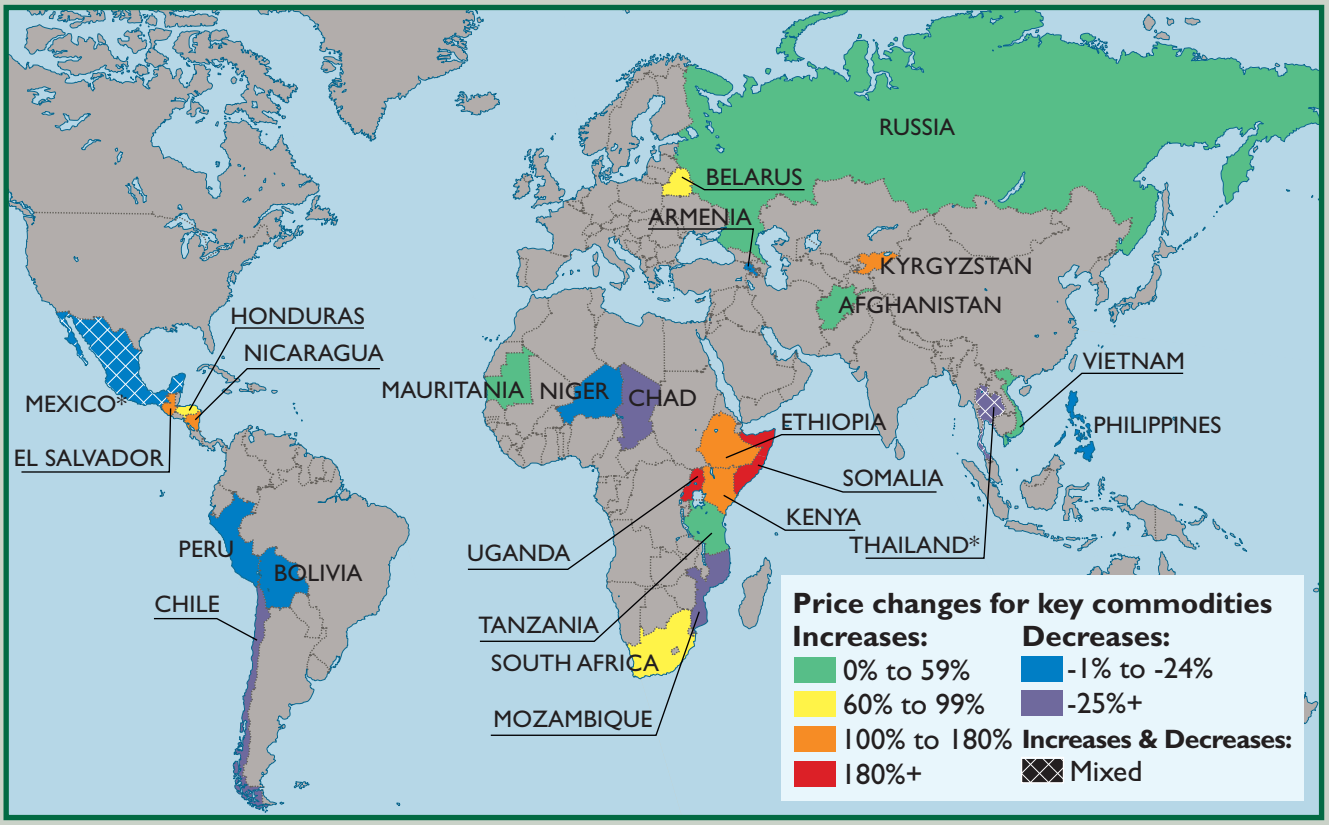
"We have been emphasizing that these high prices are not one event; these are the prices we'll have to live with — not like the past," he continues. "This has taken poorer countries by surprise who are used to decades of low prices."

Other experts agree that higher food prices aren't going away. In February, world food prices reached record levels, following eight consecutive months of increases. Wheat traded at

Poor Nations Hit by Big Price Spikes

Several of the poorest countries in Africa, Asia and Latin America are grappling with food prices for key commodities such as maize, wheat and potatoes that are more than twice last year's prices. In Somalia and Uganda, some prices have nearly tripled. At the same time, prices have dropped for certain commodities in some cities in other countries — such as the prices for potatoes in Santiago, Chile, and cassava flour in Bangkok, Thailand.

Price Changes for Key Commodities, 2010 to 2011



** In Mexico, maize prices rose in Culiácan but fell in Mexico City. In Bangkok, Thailand, cassava prices fell more than 25 percent, while maize fell less than 10 percent.*

Source: "Global Food Price Monitor," Food and Agriculture Organization of the United Nations, September 2011, www.fao.org/giews/english/gfpm/GFPM_09_2011.pdf . Map by Lewis Agrell

$8.50 to $9 a bushel — more than twice the $4 price in July 2010. [8] Corn prices had nearly doubled from the year before. [9] Although prices have declined slightly since their peak in February, they remain near the 30-year record set in 2008, which sparked global food riots.

Normally, farmers benefit from high crop prices. Indeed, since June 2010, some 24 million farmers in low- and middle-income countries have escaped extreme poverty as a result of rising food prices, according to the World Bank. But the sudden price swings caught many small farmers in developing countries by surprise, making it difficult to boost their plantings to benefit from the higher prices, even as their own family food costs were skyrocketing.

The 24 million farmers who have benefited from higher prices have been dwarfed by the 68 million others, including city-dwellers, who fell below the $1.25-a-day poverty line set by the World Bank. The net result: An extra 44 million people have fallen into extreme poverty in response to higher food prices. [10]

Although prices for the four major world grains — wheat, corn, rice and soybeans — are set at the Chicago Mercantile Exchange, the effect of ris-

ing prices differs enormously around the globe. In the United States, "if the price of wheat doubles, a loaf of bread goes from $2 to $2.10, because most of what we eat is packaging and transportation. But if you live in northern India or Pakistan, and you go to the market and buy wheat, bring it home and grind it into flour and make chapattis, the price for your bread basically doubles," explains Lester Brown, an environmental activist and founder of the Earth Policy Institute, an environmental research organization in Washington, D.C.

And once the price of a major grain goes up, consumers often substitute another — such as corn — causing all grains to rise together.

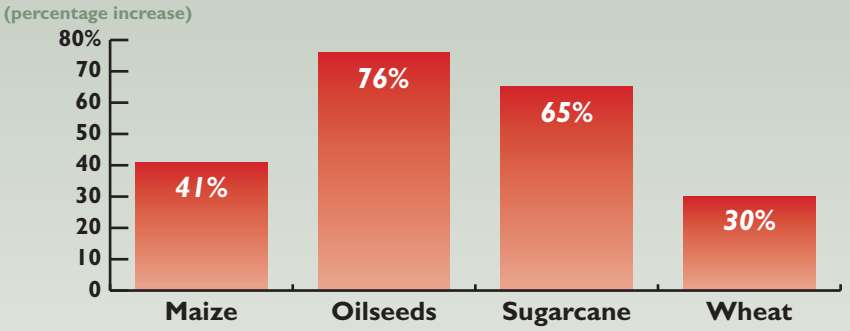
"The era of cheap prices is over," says Brown, who sees high prices as a sign that climate change already is making it harder to grow food.

Food prices are rising for several reasons, and everyone has a favorite culprit. But in agriculture, it's usually a combination of poor weather, an imbalance between supply and demand and low surplus stocks. Some also blame the rising worldwide demand from biofuels (fuel made from corn, sugarcane or other plants), which will consume 40 percent of the U.S. corn crop this year — up from 31 percent in 2008-2009. Since the 1970s the government has been mandating a minimum amount of ethanol be blended into the nation's motor fuel supply and has offered tax incentives to petroleum refiners for adding up to 10 percent ethanol to each gallon of gasoline they sell. U.S. transportation fuels must contain a minimum of 12.6 billion gallons of corn-based ethanol this year, creating a guaranteed share of the motor fuels market for ethanol, originally intended to be roughly 10 percent. This has triggered a surge in demand for corn, the main ingredient of U.S.-produced ethanol. Thus, world corn prices now increasingly are linked to the rising price of oil. [11]

Biofuels Linked to Future Food Price Hikes

The anticipated global expansion of biofuels by 2020 will significantly increase food prices for select commodities, according to ActionAid, a Johannesburg-based humanitarian group. Prices for the oilseeds (such as canola, safflower and mustard, all of which are used to make biodiesel) will rise by nearly 80 percent. Prices for sugarcane and maize — used in other biofuels — are expected to rise by 65 and 41 percent, respectively.

Projected Food Price Hikes by 2020 Due to Biofuels Expansion
(based on 2008 prices)



Source: "Meals Per Gallon: The Impact of Industrial Biofuels on People and Global Hunger," ActionAid, January 2010, www.actionaid.org.uk/doc_lib/meals_per_gallon_final.pdf

Others blame rising prices on the growing influence of commodities speculators. In January, French President Nicolas Sarkozy said commodities speculation was "extortion" that was "pillaging the poor." [12] Both the European Union and the G-20 nations are considering curbing speculators, just as the United States did last year when it enacted the Dodd-Frank Wall Street Reform Act. But some anti-poverty activists say the EU and G-20 proposals already are being watered-down due to opposition from the United Kingdom and the financial industry. [13]

Nevertheless, some long-term trends are sure to keep prices high, including the burgeoning world population, increasingly hotter, drier weather and a growing global appetite for grain-intensive meat among consumers in emerging economies such as China. To meet this growing demand, the planet's farmers will need to approximately double their output over the next 40 years in order to feed the additional 2 to 3 billion people projected for 2050, according to the FAO.

However, the rate of growth in agricultural production has been slowing in recent years compared to the hyperproductive 1960s-80s, when the so-called Green Revolution helped some countries' farmers boost their yields each year with new fertilizers and modern techniques. Globally, agricultural output has grown by 2.3 percent per year since 1961. But over the next 20 years, production growth is expected to fall to 1.5 percent a year, then plummet to less than 1 percent in the two decades leading up to 2050, the year world food demand is expected to double, the FAO says. [14]

And because of the heavy toll agriculture is taking on the environment, feeding the planet will only get more difficult, experts say. "The rise in demand from population growth, growing

affluence and biofuels are on a collision course with our ability to produce food," says Jonathan A. Foley, director of the Institute on the Environment at the University of Minnesota.

Agriculture is now the main human-created threat to the environment, Foley contends. A high-tech menu of fertilizer-dependent improvements introduced by American agronomists to the developing world in the 1960s may have increased yields, but it also is exhausting and degrading soil and water supplies, some experts say. (*See p. 512.*)

"We've got to get back to some sustainable level globally; otherwise we'll go extinct sooner or later, like every other species has," says University of Nebraska agronomist Charles A. Francis, a visiting professor of agroecology at the Norwegian University of Life Sciences in Aas. Agroecology incorporates environmental stewardship into farming. (*See sidebar, p. 512.*)

New biotechnology advances conceivably could increase crop yields. But some experts say it's time to start thinking locally, using what the World Bank calls "climate-smart agriculture" — finding local, traditional farming techniques and indigenous food plants that are well suited to hot, dry climates, particularly if future weather patterns move in that direction.

Droughts like the one causing famine in Somalia and near-famine conditions in Ethiopia will become more common, some experts predict. African farmers, who for centuries planted their crops on June 24 — confident that the rainy season would arrive within a week or two — now "have no idea whether the rains will start in May, June,

Could That Seed in a Jar Save Mankind?

Ancient plants could save millions from starvation.

A few years ago, Israeli scientists took University of Minnesota agricultural economist Philip G. Pardey on a drive around Israel to see some plants. But not just any plants. The unimpressive, weedy-looking plants were the wild wheat from which our biblical ancestors made their bread.

Those ancient plants may be all that stands between a fungal disease that threatens 90 percent of the world's wheat crop and the survival of millions of people if the disease jumps to other continents. A fungus called stem rust regularly devastated wheat crops throughout the world until the late 1960s, when a resistant wheat variety was found. Then in 1999, a strain of stem rust in Uganda — Ug99 — was found to have overcome that resistance. [1]

But many of the wild, biblical wheat varieties are resistant to Ug99, according to Pardey. And it would be "really valuable" if someone could figure out which variety has the gene that is resistant to the disease, he says.

For scientists at the Kew Millennium Seed Bank in West Sussex, south of London, the search is a race against time. Although seed banks exist around the world, Kew is collaborating with more than 50 countries worldwide on the largest-ever effort to collect and conserve wild plant species.

As part of a 10-year program, Kew researchers first hope to save the wild relatives of 16 major food crops — including staples like rice, wheat and sweet potatoes. Then the scientists will help breeders find valuable traits — such as resistance to drought and disease — that can be bred into conventional crops.

Kew plans to preserve seeds for up to hundreds of years, depending on the species, in its modern, glass and concrete building that functions like a time capsule. The seeds can be protected in a vault designed to withstand earthquakes and nuclear accidents, and the building has state-of-the-art facilities for seed-drying and cold storage.

But Kew's secret weapon is the old-fashioned Mason jar, complete with orange rubber ring. After extensive testing, the jars were found to keep seeds the driest.

To preserve the seeds of heirloom plant varieties in danger of disappearing, Kew's scientists train farmers and home gardeners around the world to save seeds in Mason jars with a bit of charcoal or rice to keep them dry.

"We want to get away from the idea that a seed bank is just for saving seeds long into the future," says Kew International Projects Coordinator Kate Gold. Kew is part of a broad international effort to save indigenous vegetables in places like sub-Saharan Africa. As diets shift toward processed, Western foods, traditional recipes for nutritious, local vegetables are being lost, along with the habit of growing them.

"If you walk into a grocery store in Dakar [Senegal] or Abidjan [Ivory Coast] you find very few local products; you'll find boxed milk from Belgium and rice from Thailand," says Danielle Nierenberg, an expert on livestock and sustainable agriculture at the Worldwatch Institute, who has documented efforts to reclaim locally grown foods in 25 sub-Saharan countries. [2] "Indigenous vegetables have been long ignored by research institutes, consumers and farmers because they're considered poor people's foods — or even weeds — so people have lost their taste for them."

Yet such vegetables often are an important source of micronutrients like Vitamin A, zinc and iron. In school gardening projects, young Africans are re-discovering the tastes of their grandparents by learning to make traditional recipes, according to the institute, which promotes sustainable development.

Kew often finds plants in danger of disappearing by talking to community members who remember eating them. In

western Kenya, for instance, Kew researchers discovered 50 plants whose existence and preparation were known only to village elders.

In Zambia, horticulturalist Mary O. Abukutsa-Onyango of Nairobi's Jomo Kenyatta University of Agriculture, has reintroduced farmers to vegetables that can survive in the marginal, arid soils of Kenya's lowlands. Many of the approximately 200 indigenous plants used by Kenyans in the past now "are either unknown or extinct," she laments. [3]

Kew scientists also hope to find plants that are resilient to climate change, such as a wild rice relative that flowers at night when it is cooler. If future temperatures rise even a few degrees, rice yields would drop by 30 to 40 percent. But if night-flowering characteristics were incorporated into farmed rice, millions of tons could be saved.

"If we lose all our natural resources, we don't know what options we're cutting off for the future," says biologist Ruth Eastwood, who coordinates Kew's program to collect wild relatives of conventional crops.

Most seed banks have no way of knowing whether the thousands of seeds they hold have valuable traits, and government funding for the necessary genetic research has been lacking. "If the seeds are sitting in the seed bank and you have no genetic information about them, they're effectively worthless," says Pardey.

Still, seed-savers like those at Kew are "real heroes" to Jonathan A. Foley, a climate scientist and director of the University of Minnesota's Institute on the Environment. Since agriculture began 10,000 years ago, thousands of crops have been lost. In fact, only 12 species contribute 80 percent of humans' total dietary intake today, compared to the more than 7,000 that were used at some point in history. [4]

"Throwing away the knowledge of previous generations is a huge loss to civilization," says Foley. "Who knows when the seeds might be valuable [in resisting] climate change or the next disease?"

CQ Press/Sarah Glazer

At England's Kew Millenium Seed Bank, Moctar Sacandé, international project coordinator for Africa, displays a fruit from the African baobab tree that is rich in vitamin C and calcium. Kew is storing seeds of wild foods like the baobab in hope of saving those with valuable traits from extinction.

— Sarah Glazer

[1] Brendan I. Koemer, "Red Menace," *Wired*, Feb. 22, 2010, www.wired.com/magazine/2010/02/ff_ug99_fungus/.

[2] "State of the World 2011," Worldwatch Institute, www.worldwatch.org/sow11.

[3] *Ibid.*, p. 34.

[4] Zareen Bharucha and Jule Pretty, "The Roles and Values of Wild Foods in Agriculture," *Philosophical Transactions of the Royal Society B*, 2010, pp. 2913-2926, http://rstb.royalsocietypublishing.org/content/365/1554/2913.full.pdf.

July or even August," reports American agroecologist Roland Bunch. [15]

"The reality is we have to double production by 2050 or so, and we have to completely halt almost all the environmental damage from large-scale agriculture without giving it up," says Foley. More planet-warming carbon is emitted when tropical rain forests are cleared for farming than is emitted by all forms of transportation worldwide, he points out.* In a paper for the November issue of *Scientific American*, Foley says the world could halt further expansion of farmland while still satisfying the need to double agricultural production by mid-century — if it adopts ecological practices. [16]

"It's at least physically possible to do it," he says. "Whether it's politically tenable is another question."

As scientists, governments and activists debate how to provide enough food at affordable prices without damaging the environment, here are some of the questions being debated:

Are government incentives for biofuels driving up food prices?

This year for the first time in history, more American corn is going to ethanol refiners than to poultry and livestock producers, accounting

* When tropical forests are cleared for farming, they are often burned down, releasing large amounts of carbon. In addition, the cleared forests are no longer there to absorb carbon dioxide from the atmosphere. [17]

AFP/Getty Images/Raveendran

An Indian policeman beats a demonstrator during a protest against rising inflation in New Delhi on Feb. 24, 2011, when food inflation was running at more than 11 percent in India. Consumer prices for food had risen by 80 percent in six years, according to the Credit Suisse investment house.

for 40 percent of this past year's crop, according to the U.S. Department of Agriculture. [18] Meanwhile, world corn prices in July were up 90 percent over the same time a year ago. [19]

Since 1978, when corn prices were at rock bottom, the U.S. government has been promoting development of a corn-to-ethanol industry as a way to provide both a new market for American corn and a clean, renewable source of motor fuel. Between 1980 and 2000, the industry received some $19 billion in tax breaks alone, according to the Government Accountability Office. The three major incentives have been a tax credit to oil refiners to blend ethanol into gasoline, a tariff to block cheaper imported ethanol (mainly from Brazil) and a mandate to produce enough ethanol to make up about 10 percent of the automotive fuel supply. In some cases the biofuel subsidies have been so generous that on a per-gallon basis, they have exceeded the total cost of the gasoline being replaced by the biofuel. In 2010, ethanol incentives cost American taxpayers $7 billion in tax credits, tariffs and other incentives. [20]

American taxpayers "get to pay twice," says Brown, of the Earth Policy Institute. "Once on April 15th and then at the supermarket checkout counter," in the form of higher food prices.

As the world's largest corn producer, the United States traditionally has set world corn prices. And because corn is one of the world's main food staples, U.S. ethanol policy significantly affects world food prices, say critics of the policy. [21] "You can't take 40 percent of the U.S. corn crop and divert it to ethanol and not expect to have a price effect," says C. Ford Runge, a professor of applied economics and law at the University of Minnesota. He estimates that up to a third of the record world food prices in 2007-08 were caused by government ethanol policies.

Farmers, feed companies and their supporters lobbied hard for the ethanol subsidies — adopted in the 1970s and '80s, when corn prices were around $2 a bushel (vs. almost $7 for most of this year) and farmers were barely breaking even. The program was designed to boost corn prices, Runge contends. "To deny this is what happened is disingenuous," he says. "This was the idea — and it worked."

European governments eventually adopted similar incentives, and today subsidies for EU farmers to produce biofuels total more than $5.3 billion annually, according to ActionAid, a nonprofit based in Johannesburg devoted to fighting hunger and poverty. [22] The Brazilian government also has a heavily subsidized biofuels industry, based on sugarcane.

The FAO and other international organizations recommended in a June report that G-20 governments remove their biofuels mandates and subsidies. Subsidies are encouraging the diversion of crops from food to fuel and pushing food prices up, the report said. And as government biofuels policies link crop prices ever closer to the price of oil, the report noted, abrupt rises in the price of oil can increase food price volatility, making it hard for farmers to know how much to plant. [23] The United States and Brazil successfully lobbied against the recommendation when the G-20 met in June, and the final communiqué was watered down significantly. [24]

"In the FAO, we do feel that biofuels policies — and export restrictions — have played a part in leading to higher and more volatile prices," says David Hallam, director of FAO's markets and trades division. However, "whether the impact of biofuels on prices is 15, 20 or 30 percent is difficult to pin down."

Bruce Babcock, an agricultural economist at Iowa State University, downplays the impact of biofuels subsidies — so far. Until now, he says, the subsidies have had only a "modest" effect on world corn prices — about 7 percent in 2007 — and even less on U.S. retail food prices. But in 2011, world corn prices will be about 17 percent higher than they would have been if ethanol subsidies were eliminated, he

estimates. That bigger price effect for this year, he says, is due to today's tight market conditions: Ethanol is in high demand when oil prices are high — as they are now. [25]

Babcock maintains that today's high oil prices alone give the industry plenty of incentive to produce, even without government hand-outs. But would the ethanol industry even exist without government mandates?

"If ethanol hadn't expanded, corn would have been so cheap compared to gasoline that someone would have figured out, 'My gosh, I can make a fortune buying this cheap corn and turning it into a substitute for gasoline and selling it,' " he says.

Rob Vierhout, secretary-general of the Brussels-based European Renewable Ethanol Association (ePURE), says food export bans — such as the one Russia imposed on its wheat in 2010 and 2011 — have done more to drive up world food prices than biofuels subsidies. (*See "At Issue," p. 517.*)

But Timothy D. Searchinger, a research scholar and lecturer in public and international affairs at Princeton University's Woodrow Wilson School, counters, "If it weren't for biofuels, you wouldn't have had the run-up in prices and the fear that made countries [like Russia] put on export controls," because heads of state "know that governments fall when food prices get too high."

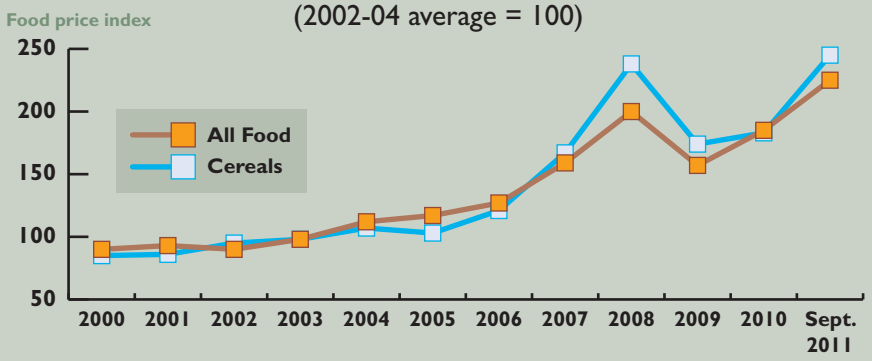
Still, if biofuel mandates and subsidies were removed tomorrow, world corn prices — and food prices in general — would crash, say some experts. "If you were to dismantle mandates overnight you would suddenly be left with over 100 million tons — if not more — of grains, which could result in a complete collapse of world grain prices, sending shock waves to farmers across the world and bankrupticies," warns FAO economist Abbassian.

"The kinds of things I see do not justify to me that making biofuels from corn makes either economic or environmental sense, but now that we have established the sector it will be adding another fuel to farmers' problems if we dismantle it overnight," he warns.

Food Prices Soared in Past Decade

World food prices have risen significantly since 2000, with cereals now costing 145 percent more than the 2002-04 average and 75 percent more than the overall 2010 price. Prices for both cereals and food fell slightly in 2009, as supplies rose, but have jumped since then. By this September prices had exceeded their 2008 peak, when food riots erupted around the world.

Changes in Global Food Prices, 2000 to 2011



Source: "FAO Food Price Index," Food and Agriculture Organization of the United Nations, October 2011, www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/

Are commodity speculators causing high and volatile food prices?

Commodity speculators have been blamed as the main culprits behind skyrocketing food prices by French President Sarkozy, the U.N. special rapporteur on the right to food and EU Commissioner Michel Barnier, who has called such speculation "scandalous." [26]

Paradoxically, Chicago's commodities markets were established to provide price stability for farmers faced with unpredictable harvests and to large grain buyers, such as flour mills, seeking to nail down a price before harvest time. Over the last 15 years, however, participation by speculators without any role in farming or food processing has risen from just 12 percent of the market to 60 percent today, according to the London-based activist group World Development Movement, which campaigns against global poverty. [27]

"Food prices at historic levels are being driven by financial speculators," says Murray Worthy, author of the recent report for the group. "We definitely think there's much more rapid price inflation" as a result. He says large index funds are most to blame.

Since Congress deregulated the commodities market in 2000, index funds for a basket of commodities have risen in popularity, especially for investors seeking a safe haven from the stock market.

Commodity markets traditionally work on short-term futures contracts. When Farmer Brown plants his corn crop in April, he enters into a contract, with, say, General Mills, to deliver corn at $7 per bushel on September 30, cushioning himself against a possible drop in the price below $7 during that five-month period. Unlike farmers and grain buyers, pension funds tend to be in the market for long-term gains; so each time a short-term contract expires the funds buy a new one.

Critics say index funds encourage a speculative environment independent of the traditional market "fundamentals," such as the size of the corn harvest or how much market demand exists for a crop.

"You have a pension fund that buys into commodities and wants to hold the portfolio for 5-10 years, and every month they have to re-buy the contract just to keep their bets on the table," says David Frank, research director of Better Markets, a nonprofit group in Washington that advocates stricter regulation of commodities. "Since everyone else in the marketplace knows they have to buy these contracts [each month], it basically pushes up the prices synthetically in advance of the pension-fund buying. So you see this long-term upward creep of prices."

The monthly buying and selling of contracts creates a volatile, "whipsaw effect" on prices, destroying farmers' and grain buyers' ability to plan, according to Frank and other critics. Congress bought their argument when it passed the Wall Street reform act, which limits the share of a market that can be held by either individual speculators or by a class of speculators. Those caps are known as "position limits."

Kenneth Raisler, general counsel of the Commodity Futures Trading Commission (CFTC) during the Reagan administration, says concern about speculation is based on a misunderstanding of the market. The commodities market has always relied on speculators to play a useful role — assuring farmers of future revenues by agreeing to buy the actual crop, for example. And commodities investments are time-limited, Raisler says, because the contracts have an expiration date. So commodities investments can't be exerting the long-term upward pressure on prices that critics describe, he says.

"It is fair to say that the CFTC's initiative around position limits and Congress' discussion was built on misinformation and the political impact of the information," he says. "I think the position limit regulations are potentially very destructive of the U.S. markets. I don't think there's any evidence that driving these people out of the market is a good thing."

University of Massachusetts Professor of Economics Robert Pollin, who has testified in favor of speculation limits, agrees speculators can play a useful insurance role for farmers — but only up to a point. The more the commodities market starts to look like the financial markets, the more trouble he sees ahead.

Such markets "are easily overtaken by speculative bubbles, and that's what we're witnessing now," he says. "We've turned the commodities market into a securities market vulnerable to the forces of psychology and bubble speculation."

A blizzard of academic and industry papers debating speculators' impact on food prices has left even FAO experts somewhat bewildered. So far the studies are "giving us completely indecisive results as to who is at fault here," says FAO economist Abbassian.

"We don't feel what people call speculation is the root cause of the price movements we've seen," but it does cause more short-term swings and exaggerated short-term price hikes, says the FAO's Hallam.

As a result, Abbassian says, the G-20's next step "is not about regulation; it's about knowing more about what goes on in that market and how the market actors benefit from all these derivatives." The G-20 is developing an expanded information system showing who is trading what in the market — copied from U.S. legislation.

In recent years, as pension funds and others invested dollars on a scale never seen before, commodities index fund holdings swelled from $13 billion in 2003 to $317 billion in 2008. [28] "Your retirement fund dollars are helping to make decisions that affect the world's poorest people," says Alan Bjerga, an agricultural policy reporter for Bloomberg News and author of a new book *Endless Appetites: How the Commodities Casino Creates Hunger and Unrest.*

Historically, he points out, the value of corn has been based on the number of people who need to eat it. Now, he says, it's based on what "these investors need to save for their retirement. The meaning of corn has changed."

Can farmers meet increasing demands for food at affordable prices?

Over 200,000 people will sit down to dinner tonight who weren't there last night, and many will be facing empty plates. That's how environmental activist Brown describes the inexorable rise in the planet's population. [29]

World population growth is expected to increase the demand for food by 70-100 percent by 2050, according to the FAO. [30] To meet that demand at affordable prices, farmers would need to boost the number of bushels they harvest per acre, something they've been able to do since modern farming techniques were introduced during the Green Revolution of the 1950s and '60s. (*See "Background," p. 512.*)

But those near-miraculous jumps in annual yields in the '50s and '60s were significantly smaller by the 1990s. "The miracle of the Green Revolution has been slowly running out of gas for the last few years," says environmental scientist Foley.

On a global basis, Foley calculates, crop yields have only grown about 20 percent in the past two decades — far from the galloping increases needed to double production by mid-century.

The Earth Policy Institute's Brown, an agricultural scientist by training, is pessimistic about the potential to increase fertility per acre. In Japan, rice yields have been flat for 14 years; and a similar plateau is found in wheat yields in Europe. [31]

"Farmers have caught up with science," he says. "We may be beginning to press against the limits of science."

At the optimistic end of the spectrum, the seed company Monsanto has pledged by 2030 to double corn and soybean yields from 2000 levels. The challenge looks daunting. If yields don't improve, the company projects, 300 million acres of additional farmland will need to be brought into production by that year to keep up with demand. [32]

Monsanto says it can fulfill its pledge through a combination of better farm management and advanced biotechnology techniques.

Economist Philip G. Pardey, director of the University of Minnesota's International Science and Technology Practice and Policy Center, also says it's "questionable" whether farmers can satisfy the world's food needs by mid-century. Yet he says it's not a technical constraint but a policy problem — the U.S. government has been ratcheting down spending on agricultural research over the past three decades — from 4 percent annual growth in the '60s to less than 1 percent today.

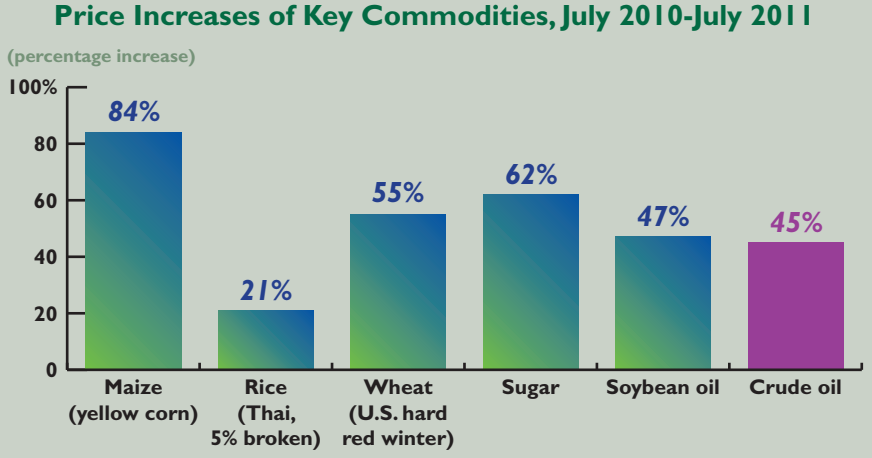
"When you spend money on research and development, it takes decades for that technology to be commercialized and find its way to farmers' fields; so slowdowns in spending in the late 1960s, '70s and '80s started to show up in the '90s as a slowdown in productivity growth," Pardey says.

"If research is slowing down here in the U.S., it has a direct impact on global food and feed supplies," he continues, because as the largest exporter of corn and wheat and the third largest exporter of soybeans, the United States dominates global agriculture. [33]

On a global basis, agricultural spending will need to increase by about $85 billion per year to meet the growing demand, the FAO has estimated. "It's an interesting question where that will come from, [since] we see spending on agriculture R&D declining in most countries," says FAO economist Hallam.

Food Prices Skyrocketed in Past Year

Prices for many food commodities, including maize, sugar and wheat, have increased by 50 percent or more over the past year — rising even more than the price of crude oil. The price of maize, a primary ingredient in ethanol as well as a staple in developing countries, nearly doubled as growers began diverting more of it to biofuels production.



Source: "Food Price Watch," World Bank, August 2011, siteresources.worldbank.org/INTPOVERTY/News and Events/22982477/Food-Price-Watch-August-2011.htm

Some scientists worry about how to grow food on a climate-challenged planet with rising temperatures and dwindling rainfall. Most of the water humans draw from rivers and aquifers already is being used for irrigation, and much of that has been contaminated with fertilizers, herbicides and pesticides.

Rising temperatures could mean fewer or no crops in many areas. Each 1-degree Celsius rise in temperature above the optimum during the growing season will mean about a 10 percent decline in grain yields at harvest-time, Brown estimates. [34]

"We're moving into a more unstable period," says University of Nebraska agronomist Francis. "We've got a huge global population dependent on benign climate, good agricultural conditions plus exploitation of fossil fuels, and we're heading into a whole new territory with limited fossil fuels, limited fresh water."

Some forecasting models have suggested that growing conditions in cooler areas of the world could benefit from increased temperatures. But the models don't take into account the vast expense of irrigation that would be needed if weather got drier, says Wolfram Schlenker, an economist at the School of International and Public Affairs at Columbia University in New York City. "If it gets warmer, and Iowa gets more like Mississippi and less like California, it's unambiguously not a benefit," he says. "The biggest challenge we have, if you talk to breeders like Monsanto, is we need to reduce plant sensitivity to extreme heat. But . . . we haven't seen it happening in the past."

Could the answer come from new breeds of plants born of biotechnology? Francis doesn't think so. Genetic modification, he says, has been "vastly overblown." [35]

"It's not going to solve the world's food problems and has done nothing to push up yield potential so far," he

says, while acknowledging that biotech's pest-resistant, herbicide-resistant varieties have helped some farmers with weed and insect problems.

Food experts like Hallam say most of the increased production will have to come from the least productive farms in places like Africa, Central America and Eastern Europe — where yields are far below their theoretical potential and could be boosted with better seeds, more fertilizer and irrigation. In his forthcoming article in *Scientific American*, Foley estimates that closing this gap for the world's top 16 crops could increase total food production by 50 to 60 percent. [36]

But some agronomists are skeptical that Western technology and its promise of fantastic yields are always transferable to places with different soil conditions and weather. Francis advocates shifting to a local approach, using home-grown techniques and fewer fossil fuels. (*See sidebar on sustainable agriculture, p. 512.*)

Although agricultural production could be boosted by clearing more land and using more water or chemicals, the planet can't take much more of that kind of degradation, say experts like Foley. Agriculture is the largest single source of climate-altering greenhouse gas emissions, mostly because expanding farming destroys tropical rain forests. Methane released from animals and nitrous oxide from overfertilized soils also contribute carbon emissions. [37]

Foley and an international team of experts have developed a five-point plan that he says would meet the planet's food needs by mid-century without degrading the environment. [38] Some of the proposals, such as using irrigation more efficiently and reducing food waste, are not controversial. But others, like eating less meat or halting the clearing of forests for farmland, will be a hard sell, especially as more of the world's people can afford a good steak. ■

BACKGROUND

Investing in Food

In the 1930s, North America was a small grain exporter. By 1966, North American grain exports had increased twelvefold — to nearly 60 million tons. [39] As the continent became the global center of the grain trade, changes in U.S. production would have huge impacts on international prices and food supply. [40]

Columbia University economist Schlenker compares America's dominance in the world food market to Saudi Arabia's outsized influence on global oil markets. Yet Saudi Arabia only produces about 8 percent of the world's oil, while the United States produces almost a quarter of the four grains that provide 75 percent of the world's calories: corn, wheat, rice and soybeans. [41]

"So the United States is really driving the market globally," he says.

America eventually came to dominate the world grain market — rather than even bigger 19th-century grain producers like the Ukraine — thanks to its railroad and canal transportation system.

The creation of a permanent futures exchange in 1874 — the Chicago Produce Exchange, the forerunner of today's Chicago Mercantile Exchange — came in the wake of wild fluctuation in the prices of wheat, partly as a result of the Civil War. It created a way for a farmer to hedge against poor prices at harvest by setting a good price in a "forward contract" for the date of delivery. The merchant who sold him the contract hoped the market price on the delivery date would be higher, leaving him with a profit. [42]

Over the years, as speculators were accused periodically of manipulating the commodities market, several laws were passed to regulate the industry. The Commodities Exchange Act of 1936, for instance, limited the number of contracts a speculator could hold, and the Commodity Futures Trading Commission, the market's regulatory agency, was created in 1974.

In 1991, a commodities trader at Goldman Sachs came up with the idea of creating an index that would track prices for a "basket" of commodities, allowing the buyers of the so-called index fund to speculate. But the fund was limited in how much trading it could do because of speculative limits dating back to 1936. Goldman asked the CFTC for an exemption from the limits, and the agency, controlled by free-market advocates appointed by President George H. W. Bush, agreed.

In 2000, the Commodity Futures Modernization Act, passed by Congress at the end of the Clinton administration, exempted most over-the-counter derivatives — contracts negotiated between two parties — from the CFTC's oversight.

Trading soared. The number of futures and options traded on commodity exchanges quintupled between 2002 and 2008. [43]

Commodities looked increasingly attractive to pension funds, hedge funds and portfolio managers because other markets were drying up: The dot.com bubble had burst, the stock market plunged soon after and the U.S. housing market collapsed in 2007-08 when the subprime crisis hit. [44] And, as U.N. Rapporteur on the Right to Food Olivier de Schutter has described it, the growing attraction to commodities as sound investments can be explained by the simple belief that people "will always have to eat." [45]

Yet as the market grew, commodity prices appeared to some experts to be increasingly divorced from market fundamentals of supply and demand. "Over the years of deregulation, we've established a virtual market out there, and farmers are getting frustrated when they see [commodity price] changes are not always reflecting the actual fundamentals," FAO economist Abbassian says.

Continued on p. 512

Chronology

1940s *Rockefeller Foundation begins funding crop research in Mexico that will evolve into a worldwide Green Revolution.*

1944
American agronomist Norman Borlaug teaches modern techniques to Mexican farmers, boosting wheat crops and launching Green Revolution.

1950s-1970s

China's collective farming experiment fails disastrously. Green Revolution boosts crop yields in developing countries. . . . United States becomes major grain exporter; China reintroduces family farming; Soviets expand livestock production, boost grain imports; Brazil improves its grasslands.

1959-61
Collective farming in China causes deaths of 30 million Chinese due to famine.

1972-74
World food prices hit record highs after Soviet Union buys record amounts of U.S. wheat.

1973
Arab oil embargo contributes to rising food prices as farmers' costs of oil-based fertilizer, fuel skyrocket.

1975-76
Brazil launches its program to make ethanol from sugarcane, mandating that it be blended with gasoline to power a fuel-flexible auto fleet.

1978
U.S. Congress exempts ethanol from gasoline taxes.

1980s *United States and Europe have food surpluses; world corn prices hit record lows; ethanol incentives gain traction in United States.*

1990s *Market reforms after collapse of Soviet Union help reduce Russia's need for grain imports. . . . New speculators enter U.S. food commodities markets; share of world's hungry declines.*

1991
U.S. investment bank Goldman Sachs creates first index fund to track basket of commodities. . . . Soviet Union disbands on Dec. 31, 1991.

1998
Russia becomes net exporter of wheat for first time in quarter-century.

2000s *World food prices spike to record highs twice, triggering riots in 2008. . . . Congress deregulates commodity trading. . . . Russia becomes major wheat exporter.*

2000
Congress exempts most over-the-counter derivatives contracts from government oversight; commodities trading soars.

2006
United States passes Brazil as world's leading producer of ethanol.

2007
U.S. Congress mandates a tripling in production of renewable biofuels by 2022.

2007-2008
World food prices hit record high due to rising energy costs, falling grain stocks. Food riots break out in 60 countries.

2010s *Arab Spring revolutions follow spike in food prices. . . . Congress imposes curbs on commodities speculation. . . . Ethanol production absorbs 40 percent of U.S. corn crop.*

2010
After worst drought in a century, Russia bans wheat exports. . . . Bread prices surge in Egypt, Russia's largest wheat customer. . . . President Obama signs Dodd-Frank bill curbing speculation in commodities market.

Jan. 4, 2011
Street vendor Mohammed Bouazizi dies after setting himself on fire in protest, spurring revolution in Tunisia.

Jan. 25, 2011
Street demonstrations spread to Egypt, partly in response to high food prices, leading to overthrow of President Hosni Mubarak. . . . Protests and demonstrations break out throughout the Middle East.

February 2011
World food prices hit all-time high and then decline only slightly.

Nov. 3-4, 2011
G-20 nations scheduled to meet in Cannes, France; commodity-speculation measures are on agenda.

Continued from p. 510

Green Revolution

In 1944, an American agronomist, Norman E. Borlaug, went to Mexico to help farmers boost their wheat crop under a partnership between the Rockefeller Foundation and the Mexican government. The wheat varieties introduced by Borlaug doubled yields in Mexico, and Borlaug's efforts soon became a worldwide movement, later dubbed the Green Revolution.

Borlaug, who received the Nobel Peace Prize for his work in 1970, became known as the father of the Green Revolution, widely acknowledged for boosting crop yields by bringing modern farming techniques, such as fertilizers and irrigation, to South America and Asia.

Wheat varieties dependent on fertilizer, like those that had been successful in Mexico, were introduced in the early 1960s in India and Pakistan, tripling yields there. The success with wheat was soon repeated with rice. The semidwarf rice variety IR8, developed by the International Rice Research Institute in the Philippines, tripled the tons per acre harvested in India between 1961 and 1970 and turned India into one of the world's leading rice producers. The high-yielding "miracle rice" was credited with saving millions from famine. [46]

Luckily, the Green Revolution emerged in Asia just before the 1972-74 world food crisis. The continent — by then enjoying bigger local harvests — was protected from the worst impacts of the price hikes. [47]

By the 1990s, nearly 75 percent of the rice grown in Asia came from Green Revolution seeds, along with about half the wheat planted in Africa, Latin America and Asia and about 70 percent of the world's corn. [48]

Meanwhile in China, agricultural productivity began to improve in the 1970s after the government made major policy changes and adopted technological innovations. Between 1978 and 1984, the Chinese Communist Party

Can Ecological Farming Feed the World?

Ancient techniques are replacing conventional methods.

Thirty women gathered under a shade tree in the Malawi village of Koboko to answer questions from an American visitor about the biggest problem they face in producing enough food to feed their children.

The answer was surprising to consultant Roland Bunch, a prominent advocate of ecological farming practices. He was expecting to hear about the devastating droughts that had reduced people in Malawi to eating tree bark.

"Our soil is tired out. And it's getting worse every year," said one of the women. Soon others chimed in. "Our soil has become so hard that even when it rains, the water just runs off." Despite enough rain, one woman said she harvested only 27 bags of corn, compared to 35 the previous year. [1]

Over the following year, Bunch heard the same story in five other African countries — Zambia, Kenya, Uganda, Mali and Niger: Harvests were crashing, dropping 15 to 25 percent a year. Whole villages had been compelled to move in search of more fertile land; some were turned back by force at the borders by police.

Droughts and depleted soil are affecting much of eastern Africa, producing famine in Somalia and near-famine in Ethiopia. Some international organizations recommend providing either free or subsidized chemical fertilizers, since a bag of fertilizer is unaffordable for most small farmers. But as a leading proponent of agroecology — a farming philosophy that focuses on protecting the environment — Bunch says chemical fertilizers won't solve the underlying problem: the loss of organic matter that makes soils fertile.

Loss of soil nutrients, he warns, threatens to cause widespread famine — a result of climate change-induced droughts, a dearth of animal manure and farmers' inability to allow some fields to lie fallow and replenish themselves. The farmers say they must farm all their land every year just to survive.

Instead of chemical fertilizers, agroecologists use cultivation methods dating back to the Roman Empire, such as "green manuring" — planting a variety of crops together and leaving some to rot on the soil's surface after harvest — and planting trees on cropland to provide cooling shade and fallen leaves that rot into organic matter.

In West Africa's arid Mali, for example, the cliff-dwelling Dogon ethnic group have tripled their millet output per acre by interspersing cowpea legume plants, which add to soil fertility, with their millet and having herders bring their cattle in to stay overnight in the fields, leaving behind their manure.

Green manure cover crops are being used by more than a million farmers worldwide, mostly in Central and South America. Brazil is integrating trees, crops and livestock in the same fields as part of its strategy to boost its already impressive agricultural yields on once infertile grasslands. [2]

However, some critics say, despite reports of improvements for small-scale farmers like the Dogon, organic farming methods produce less food per acre than the Midwest's large-scale conventional farms, with their heavy dependence on artificial fertilizer. Adherents of organic farming answer that no large-scale comparative studies have been done to answer the question scientifically. Yet even those sympathetic to organic farming say it can't meet the planet's need to double food production in the next 40 years.

"You can't feed the world on organic broccoli," says Jonathan A. Foley, a climate scientist and director of the University of Minnesota's Institute on the Environment, noting that organic farming contributes less than 1 percent of today's agricultural production.

However, advocates of ecological agriculture point out, most of the world's farmland is cultivated by small farmers — not the agribusiness companies that account for most international trade. In addition, only 10 percent of the world's food is traded internationally, so low-cost ecological methods hold the most promise for improving small farms and local sustenance, they contend.

In a study of 286 projects in 57 developing countries that practiced some form of agroecology, Jules Pretty, an environment professor at England's University of Essex, found crop yields improved 79 percent, on average, over previous farming practices. [3]

Increasingly, as fertilizer gets more expensive, even large-scale Midwestern farms are practicing "no-tillage" methods — leaving crop waste behind to rot in the fields and replenish organic matter — and using satellite navigation to help spread fertilizer more efficiently and avoid wasteful double-dumping.

But acroecologists say even more radical change is required. "What we need now is more locally specific systems, unique to each place and environment — not the quick-fix menu offered by agribusiness out to sell products and not to feed the world," says Charles A. Francis, a visiting professor of agroecology at the Norwegian University of Life Sciences outside Oslo.

Many conventional farming techniques — such as those introduced during the Green Revolution in the 1960s and '70s — are becoming unsustainable in major food-producing areas like India's northwestern Punjab region, northern Mexico and Vietnam's Mekong Delta, where they are depleting and polluting groundwater, and pests and diseases are becoming resistant to chemical controls. [4]

"We don't want to drink all that stuff in the water and eat all that pesticide residue on food," Francis says.

But an international team headed by Foley proposes that in order to double global food production by 2050, when the world population is expected to reach 9 billion, both approaches will be necessary. Ecological practices will have to be incorporated into large-scale farming in order to boost yields while still protecting the environment. [5]

"Organic" is a feel-good label, but it doesn't necessarily tell you whether the farmer used water wisely or fostered biodiversity, Foley observes. The warring schools of organic and conventional farming, "need to put down our guns," he says. [6] "We don't have time for that anymore."

— Sarah Glazer

---

[1] Roland Bunch, "Africa's Soil Fertility Crisis and the Coming Famine," in "State of the World 2011," Worldwatch Institute, 2011, p. 59.

[2] *Ibid.*, p. 68. For Brazil, see "The Miracle of the Cerrado," *The Economist*, Aug. 26, 2010, www.economist.com/node/16886442.

[3] Worldwatch Institute, *op. cit.*, p. 20.

[4] *Ibid.*, p. 23.

[5] Jonathan A. Foley, *et al.*, "Solutions for a Cultivated Planet," *Nature*, Oct. 12, 2011, www.nature.com/nature/journal/vaop/ncurrent/full/nature10452.html.

[6] For background, see Kathy Koch, "Food Safety Battle: Organic Vs. Biotech," *CQ Researcher*, Sept. 4, 1998, pp. 761-784.

adopted economic reforms and reintroduced family farming. After more than 30 years of collective agriculture, small farmers were allowed to grow their own food and market their surplus. (This was an ideological reversal from Mao Zedong's disastrous Great Leap Forward, which aimed to increase industrial production by diverting thousands of peasants from private farms to factory work and converting their farmland to collective farming operations. Harvests plummeted, leading eventually to the great famine of 1959-61, which left an estimated 30 million dead.) [49]

The reforms returned more than 95 percent of China's farmland to approximately 160 million households, increasing rural incomes by 137 percent, reducing rural poverty by 22 percent and increasing grain production by 34 percent. [50]

Russia's shift from wheat importer to leading wheat exporter also was shaped by its transition from a communist regime to a market economy, beginning in the early 1990s.

In the 19th century, the Russian Empire was the world's major wheat exporter thanks to a rich vein of black earth stretching through the Ukraine, Russia and southwest Siberia. Communism radically undermined that, however. Josef Stalin's forced collectivization of farms in the Ukraine destroyed the landowner farming class and together with mass shipment of foodstuffs out of Ukraine to the Soviet Union resulted in the starvation deaths of 7 to 11 million Ukrainians in the 1930s. [51]

In the 1960s and '70s, Soviet leaders Nikita Khruschev and Leonid Brezhnev decided to improve the Soviet standard of living by increasing the population's consumption of meat and dairy products. To achieve this, the Brezhnev regime invested in large-scale livestock production and kept Soviet retail prices for meat virtually constant from the mid-1960s to 1990.

But, initially, the Soviet Union could not produce enough grain to support its growing livestock herds. In 1972-73,

Governments Set Biofuels Targets

Officials around the world are setting targets — some of them mandatory — for the use of renewable biofuels in transportation fuels. Some have specified a percentage of transportation fuels that should come from renewable fuels, while others established the number of gallons or tons to be produced. India wants 20 percent of transport fuels to come from biofuels by 2017, for instance, while the United States wants 36 billion gallons of biofuels produced by 2022 — the highest amount by far of any country. Diverting cropland to grow biofuels plants boosts food prices, critics say, but proponents say biofuels use only 5 percent of the world's food crops so they have only a "modest" effect on prices.

Biofuels Targets in Selected Countries
(as % of transport fuels or total volume to be produced)

Country	Biofuel target
European Union	10% by 2020
South Africa	4.5% by 2013
India	20% by 2017
Brazil	25% (of gasoline) and 5% (of diesel) by 2010
Canada	5% (of gasoline) by 2010; 2% (of diesel) by 2012
China	9.8 million tons (of ethanol) and 2 million tons (of biodiesel) by 2020
Japan	132 million gallons by 2010
United States	36 billion gallons by 2022

Source: "Meals Per Gallon: The Impact of Industrial Biofuels on People and Global Hunger," ActionAid, January 2010, www.actionaid.org.uk/doc_lib/meals_per_gallon_final.pdf

to make up for its own poor grain crop, the Soviet Union secretly bought up most U.S. wheat exports at bargain prices — and even got American taxpayers to foot part of the bill through a farm subsidy. The so-called Great Grain Robbery sent world grain prices skyrocketing, and U.S. food prices jumped 18 percent. [52]

By the 1980s, the Soviets were the world's largest grain importers, much of it feed grain and soybeans from the United States.

The Soviet Union collapsed in 1991, and after the Russian Federation adopted market-oriented reforms in 1992 real wages fell and meat demand plummeted. Subsidies to livestock farmers were abruptly halted, contributing to the falling demand for feed grain. [53]

By 1998, however, Russia had become a net exporter of wheat for the first time in a quarter-century and remained a leading exporter through the 2000s. [54] By 2008-09, Russia was exporting all grains and was a major player in agricultural markets. [55]

Meanwhile, over the past 30 years Brazil has transformed itself from a net food importer to one of the world's great breadbaskets. Since 1996, it has increased its agricultural output tenfold and now accounts for one-third of the world's soybean exports, second only to the United States. Its agricultural trade surplus has increased tenfold over the past decade, to more than $50 billion. [56]

Brazil used huge amounts of lime to reduce the acidity of the soil in its vast savannah grasslands, known as the *cerrado*, and brought in high-yielding grasses to make it good for pasturing livestock. The area now accounts for 70 percent of Brazil's agricultural production. Brazil also cross-bred soybeans, turning the traditionally temperate climate plant into a tropical crop. Recently, Brazilians have introduced some of the methods pushed by ecologists, such as growing trees between crop fields and "no-tillage farming," which leaves the husks of harvested crops to rot in the field to create fertile organic matter. [57]

From Surplus to Shortage

In recent history in the United States, overproduction was the perennial "farm problem." From the days of the Great Depression until the 1980s, American farmers experienced chronic surpluses and depressed prices, especially in wheat. To prop up prices, the federal government bought surplus crops and stored them or exported them as food aid to famine-stricken countries.

But by the 1970s, the government had found storing large stocks of surplus grain too expensive and took steps to reduce the surpluses. Grain reserves plummeted. As a result, even minor shocks to supply and demand could lead to dramatic price hikes.

Then harsh weather in 1972 and 1974, together with the massive grain purchases by the Soviet Union, created record spikes in world food prices.

Two other events helped contribute to a perfect storm for world food prices in the early 1970s. In 1971 President Richard M. Nixon devalued the dollar by taking it off the gold standard, making U.S. grain exports relatively cheap. World demand for American grain skyrocketed, and its price rose in response. [58] Then, in 1973 the Arab oil embargo caused world oil prices to skyrocket, causing general price inflation and increasing farmers' costs for petroleum-based fertilizer and transportation.

Surpluses and Low Prices

As more and more countries adopted high-yield Green Revolution seeds and farming techniques in the 1980s, food became plentiful and production grew faster than population growth. World food prices declined steadily in real terms. Most people assumed food would always be cheap, and many countries were lulled into depending on imports because they were a low-cost way of satisfying domestic food needs. By the end of the 1990s, the share of the world's population that was hungry would fall from a third to 20 percent. [59]

But cheap food was not good for American farmers. By the 1980s, corn prices were at record lows; a bushel of corn lost about one-fifth of its value over that decade. [60] Farm foreclosures proliferated throughout the Midwest as farmers found it hard to break even — despite the helping hand of government subsidies.

"Sometimes that was all your profit," says Boyd Smith, a farmer and farm manager in Lincoln, Neb. "A lot of times if your government payment was $20,000, that was your profit for the year. It was hard to make any money. . . . We were lucky to sell corn for $2 per bushel," he recalls, compared to the $7 price reached earlier this year. [61]

The strategy in the United States was to make "more production not higher prices the key to farmer income," writes Bjerga in his new book *Endless Appetites*. [62]

With each year, farmers like Smith were able to increase the number of bushels per acre through Green Revolution techniques. Lulled by these trends, governments began to cut back on agricultural research and development (R&D). Growth in U.S. agricultural R&D slowed from almost 4 percent per year in the 1960s and '70s to less than 1 percent today, according to the University of Minnesota's Pardey. Western aid for agricultural development to developing nations fell by almost half. [63]

Although yields per acre continued to grow, advances came at a much slower rate. The slowdown in spending occurred just as affluence in Asia began to rise, which would lead to more consumption of meat and grains.

"Our mindset was surpluses," explained Dan Glickman, former U.S. secretary of agriculture. "That just changed overnight." [64]

Prices Spike

With grain stockpiles low, prices doubled and in some cases tripled in 2007 and 2008. Once again (as in the 1970s) rising oil prices raised farmers' production costs, and a growing source of demand — biofuels — both reduced supplies and helped link the price of food even closer to rising fuel prices. Export restrictions and bad weather also contributed. [65]

Entire countries began hoarding food, and panic buying ensued, notably for rice. Food riots broke out in more than 60 countries, including Egypt, Haiti and Cameroon. [66]

In 2009, following the price spikes that began in 2007, an estimated 1 billion people went hungry for the first time.

Farmers responded to the higher prices by planting as much as they could, and healthy harvests in 2008 and 2009 helped to rebuild stocks. World prices declined in 2009, partly in response to the recession.

Last year, the U.S. Department of Agriculture predicted Russia would soon overtake the United States as the world's top wheat exporter by the 2010s because American farmers were shifting out of wheat to more profitable corn and soybeans. [67] But the department didn't count on the disastrous drought that hit Russia in mid-June 2010 and reduced its wheat crop by one-third. By Aug. 5, Russia had banned exports of wheat, barley, rye, corn and flour and then extended the ban into 2011. Wheat reached more than $8 a bushel — its highest price since 2008 — on the Chicago exchange.

The following month in Mozambique, where domestic wheat production covers only 5 percent of the country's needs, the cost for a sack of flour jumped 30 percent in one month. Protests erupted into riots, injuring 443 and killing 13, and forcing the government to reverse a hike in bread prices. [68]

By December 2010, the FAO announced, food prices had surpassed their 2008 peak.

That same month, vegetable seller Bouazizi set himself on fire in Tunisia, a country that imports twice as much food as it produces. Food prices were rising, and one-third of the work force was unemployed. Although Bouazizi's act of self-immolation was to protest police harassment, his burning in mid-December and his death on Jan. 4 triggered massive street protests that grew out of frustration over rising food prices, the lack of jobs and dissatisfaction with the government of President Zine El Abidine Ben Ali. Barely 10 days after the vegetable seller's death, Ben Ali fled on Jan. 15, and the government fell.

Meanwhile, Egypt, Russia's largest customer, was forced to buy more expensive American wheat after Russia banned wheat exports. The resulting spike in Egyptian food prices helped to spur the Jan. 25, 2011, uprising that would overthrow the regime in Egypt and trigger similar demonstrations and protests across the Arab World. ■

CURRENT SITUATION

Crisis Averted?

Although world food prices have dropped slightly since their all-

High Food Prices Partly to Blame for African Hunger

It's not the "absence of food" but the price of it.

Sparse rains in East Africa have caused disastrous harvests and massive loss of livestock. The devastating drought has combined with skyrocketing food prices to create one of the world's worst hunger crises in decades, according to Save the Children, an independent global charity.

In Somalia, famine and ongoing civil conflict this year have forced tens of thousands of people to cross into neighboring Ethiopia and Kenya, further swelling already crowded refugee camps. [1] More than 12 million people are estimated to need humanitarian assistance in Somalia, Ethiopia, Kenya and Djibouti, according to the U.N.

By June prices for staples like corn had risen by as much as 107 percent over a year ago, according to the World Bank, due largely to low grain stocks, coupled with export restrictions imposed by Ethiopia and Tanzania. [2]

When staple prices jumped in May and June, it wasn't because a "complete absence of food" was causing widespread hunger but the high cost of food in the markets, says Michael Klosson, Save the Children's vice president for policy and humanitarian response, who recently returned from Ethiopia. "When you've got to feed your family, what do you do? You often substitute less nutritious food," he says, leading to malnutrition for the next generation. It also hurts children in other ways.

"Families have to spend so much on food, they forego health care," he continues. "Kids are pulled out of schools because families can't afford the fees and uniforms. Frequently kids have to go to work in situations that put them at risk."

Higher prices may be good for U.S. farmers, Klosson says, but in East Africa, "typically small shareholder families are not self-sufficient. They still have to buy food. It's not a win for them if food prices are going up."

— Sarah Glazer

AFP/Getty Images/Abdurashid Abdulle

A severely malnourished child from southern Somalia is one of an estimated 12 million people in the Horn of Africa who need humanitarian assistance, according to the U.N. Skyrocketing food prices have contributed to one of the worst hunger crises in decades in the region.

[1] For background, see Jason McLure, "The Troubled Horn of Africa," *CQ Global Researcher*, June 1, 2009, pp. 149-176.

[2] World Bank, "Food Price Watch," August 2011, http://siteresources.worldbank.org/INTPOVERTY/News%20and%20Events/22982477/Food-Price-Watch-August-2011.htm#note5.

time high in February, they remain above the record prices reached during the 2008 crisis, according to the FAO. [69]

In the wake of export bans and disturbingly low global grain stocks, some experts — including FAO grain expert Abbassian — were warning at the beginning of the summer growing season that the 2008 disaster could be repeated.

"We have relatively good production, globally speaking, but not good enough to build inventories," Abbassian says. "As a result, we expect the 2011-12 season to be again one of quite strong price instability." The organization had hoped for a 4 percent rise in global production to rebuild stocks but is now projecting only 3 percent growth, Abbassian says.

Whether a crisis develops, Abbassian says, depends partly on how much corn is produced in the United States, and the Agriculture Department recently revised estimates downward because of severe droughts in Texas and parts of the Midwest. Rice production in three big rice-producing countries — Cambodia, Egypt and China — is looking better than expected, he says.

"And that gives me a certain degree of confidence in saying the likelihood of a crisis in 2011-12 is probably less than we had in 2010-11," Abbassian says.

Although the Dodd-Frank legislation enacted last year was designed to curb commodities speculation, attention now is focused on how aggressive the Commodity Futures Trading Commission will be when it writes the regulations to enforce the law.

Continued on p. 518

Are government biofuels incentives boosting food prices?

MARIE BRILL
SENIOR POLICY ANALYST,
ANDERS DAHLBECK
EUROPEAN CAMPAIGNS COORDINATOR, ACTIONAID INTERNATIONAL

WRITTEN FOR *CQ GLOBAL RESEARCHER*, OCTOBER 2011

Yes

Riots erupted and 100 million people fell into extreme poverty during the 2008 food crisis; last year another 44 million people joined them. The World Bank says biofuels account for 30 percent of the spikes in food prices, and new research blames government biofuel incentives as a contributing factor.

Global biofuels production has been driven largely by U.S. and European Union (EU) government incentives. EU blending mandates and financial incentives mean that about 9 percent of transport fuel will come from biofuels such as ethanol, biodiesel and biomass by 2020 — more than triple current levels.

Unable to meet this higher demand from domestic production, the EU imports biofuels, primarily from Brazil, but increasingly from Africa and Asia, where biofuel production often competes with food production. That generates food insecurity and helps reduce the global supply of arable land available for growing food. European biofuel production also risks diverting to developing countries the production of food for European consumers, putting further pressure on land and food supply.

Corn ethanol consumes 75 percent of U.S. federal renewable fuel dollars, benefiting from mandates, subsidies and a tariff on imports of foreign biofuel ingredients. This "incentive cocktail" inspired farmers to increase corn planting for ethanol. Today the United States burns 40 percent of its corn for fuel, more than is used for animal feed or human consumption.

American farmers are planting more corn, but weather shocks have depressed yields while growing demand for corn as food, feed and fuel have depleted stocks. Thus, corn prices are up. The United States controls more than 50 percent of the corn export market, tying U.S. corn prices to global prices. Global and local prices in developing countries are operating increasingly in tandem. In countries where food is heavily processed and transported, rising prices are broadly absorbed, mitigating the impact on consumers. Americans spend roughly 10 percent of their income on food, and 2011 prices will be up by only 4 percent. In import-dependent Uganda, however, the average consumer spends 63 percent of his income on whole foods, such as unprocessed grains, and the price of corn alone is 122 percent higher than last year. Such price increases devastate poor families.

Biofuels are not the only factor at play in rising food prices, but they're a key driver. Dropping artificial incentives can help relieve pressure on global food prices.

ROB VIERHOUT
SECRETARY-GENERAL
EUROPEAN RENEWABLE ETHANOL ASSOCIATION (EPURE)

WRITTEN FOR *CQ GLOBAL RESEARCHER*, OCTOBER 2011

No

In 2008 record high food prices triggered riots in some parts of the world. At the same time, biofuels production increased, a sector that depends on policy supports to level the playing field with fossil fuels.

Certain groups were quick to blame the biofuels industry for condemning millions of people around the globe to starvation. Do away with biofuels incentives, and nobody has to go hungry, was the tune of the day.

But such thinking overlooks the fact that hunger is, unfortunately, not a recent phenomenon. We have seen famine in years where not a single drop of biofuel was produced.

In 2009 commodity prices fell back to almost pre-peak (2008) levels. But biofuels production continued to increase, demonstrating clearly that biofuels did not have a hand in the recent commodity price increases, or at least not the strong one that some interest groups wanted to make us believe.

While increased biofuel production induces an additional demand for the raw materials used to make biofuels, this link is generally both oversimplified and overestimated. It's oversimplified, because the industry is wrongly portrayed as producing only fuel, when in reality biofuel refineries yield many different high-value products that benefit the food chain. Co-products include, among others, protein-rich animal feed, food ingredients and carbon dioxide to carbonate drinks and improve horticultural practices.

The link is overestimated because demand from biofuel production is not the only thing causing prices for soft commodities, such as wheat, to go up. Speculation, bad weather and export restrictions also have an impact on food prices.

A myth is being created that biofuel production requires huge volumes of crops. But on a global scale, only a net 3 percent of all cereals are used for biofuels — too marginal to be the sole cause of fluctuation in commodity prices.

But, let's imagine that there was a price-effect induced by increased demand. This would provide an incentive for farmers in poorer regions to grow more crops. That seems a more sustainable way forward than exporting (dumping) the oversupply of commodities on African markets.

Higher yields and improved farming methods will ensure that supply can match demand, the very basis of price stability.

Continued from p. 516

In an effort to curb commodities speculation by investors with no connection to the farming or food sectors, the law requires the agency to establish monthly limits on the amount of trading by speculators, both individually and as a group. [70]

After being deluged by at least 110 lobbying firms in the first quarter of this year (compared with 46 in the same period in 2010) the agency has delayed issuing regulations until the end of the year. [71]

Large banks are "spending a huge amount of money trying to undo [the proposals], shift the burden and delay the reforms that are targeted at them," Treasury Secretary Timothy Geithner recently told the House Small Business Committee. [72]

The U.S. rules-writing exercise is being closely followed in Europe, where similar curbs are under consideration. Recently though, according to several observers, enthusiasm has waned among European leaders who came out strongly for such limits last year.

Michel Barnier, the EU commissioner for internal market and services, proposed a regulation in September 2010 that borrows from Dodd-Frank, both in limiting the concentration of speculators and requiring mandatory reporting from those trading in over-the-counter derivatives.

Heidi Chow, an anti-hunger campaigner for the World Development Movement, calls these proposals "the key policy" for tackling speculation in the European Union.

However, Marc-Olivier Herman, Oxfam International's lead person on EU economic-justice policy, says Barnier already has "watered down" the proposal. Rather than setting out strict numerical limits on the positions speculators can hold, the proposal would give big market investors like pension funds a say in managing their positions, along the lines favored by Britain, according to Herman.

Another proposal pending before the European Commission would move unregulated trading of certain derivatives onto public exchanges, requiring reporting on their trading activity. It "will go a long way in achieving transparency of the huge over-the-counter market that caused the financial crisis," Herman says. But the proposal doesn't use that information to regulate the biggest traders, he says. "For Oxfam, the important issue is the relation between excessive speculation and food prices for poor countries. We believe [the EU] should be bolder because the potential harm is so great."

Similarly, G-20 members appear to be pulling back despite strong earlier statements by Sarkozy as France took over the G-20 presidency. "France [had] made strong comments about ways to curb speculation but came to the conclusion by the summer that the issue was market information," according to Abbassian.

When it comes to putting position limits on traders, says Chow, the British "are really resistant, and there's no real consensus among the G-20 countries about tackling it."

Action by the G-20 could come when finance ministers gather in Paris in mid-October or Nov. 3-4 at the G-20 summit in Cannes, France. ■

OUTLOOK

Climate Change

As food demand, energy prices and climate temperatures continue to rise over the long term, many experts say high food prices are here to stay.

Some are particularly worried by the impact of an increasingly affluent Chinese population, which already consumes about half the world's pork and whose per capita meat consumption grew 15-fold between 1960 and 2002. [73]

"That's going to have a huge impact on food prices," says Columbia University economist Schlenker. "That's part of why they've started buying land in Africa and other places; they want to secure their food supply." [74]

A recent report from the Worldwatch Institute, which found that global meat production tripled since the 1970s and is continuing to rise at a faster pace in 2010 than 2009, predicted that reduced pork supplies in Asia as a result of disease and expiring subsidies would translate into record pork exports from the United States to satisfy rising demand in South Korea, China and Japan. [75]

But other experts say China will satisfy most of its own demand within its borders, helped by some modest imports. Compared to Japan, which imports half its food, China only imports 1 percent, and isn't even among the world's top 10 food importers. [76]

Until 2005, China was a net exporter of food, according to the Paris-based Organisation for Economic Co-operation and Development. But in recent years, it has begun importing agricultural products, especially soybeans, on a large scale. [77]

"China will become a bigger net importer over the next 10 years, but it's a huge country and very worried about food security," says Scott Rozelle, an agricultural economist specializing in China at Stanford University's Freeman Spogli Institute for International Studies. "They don't want to become another Japan that imports half of its food. And they have relatively more agricultural resources to make sure that happens, so they're investing billions of dollars in research to increase productivity."

Some say cracks in China's self-sufficiency are just starting to show up. This year, one of every four soybean rows planted in the United States was being grown for Chinese export, and China's surprisingly large purchase of U.S. corn this summer prompted speculation that the Asian

giant could become the biggest foreign buyer of American corn within the next 5-10 years. [78]

But FAO grain expert Abbassian is not worried about China's future demand. "China will eventually become an even bigger player in the world market in purchasing food," he says, but countries like Brazil, the United States and Argentina will be able to satisfy China's needs. "In 2020, we see China as a very modest importer of 5-6 million tons of grain, which is nothing for a country of over a billion people. Five to six million tons won't have any big impact on world markets."

If global temperatures rise and rainfall becomes less frequent, especially in already-arid regions, it will strain farmers' ability to continue producing increased yields, let alone meet current demand.

A recent widely discussed paper by Schlenker and Stanford University environmental scientist David B. Lobell finds that climate change has already knocked 3.8 percentage points off world corn yields and 5.5 percent off global wheat yields. [79]

Compounding these environmental problems, growing more crops for biofuels may worsen greenhouse gas emissions, rather than ameliorating them, according to two highly respected scientific groups on both sides of the Atlantic. In a report released in October, the National Academy of Science's National Research Council noted that clearing land to grow biofuel crops may "disrupt any future potential" for storing carbon in the soil. [80] In September, a scientific advisory committee to the EU also warned that clearing forests for biofuel crops releases "large stores of carbon into the atmosphere" and said EU governments had failed to take this into account when they began encouraging the production of biofuels. [81]

Farming already emits more greenhouse gases than all transportation combined. If agriculture continues on its conventional course, farmers will have to chop down more rain forests, destroy savannahs and pollute more waterways to grow enough food. But new interest in native crops, wild relatives of conventional crops, traditional sustainable cultivation and biotechnology discoveries may uncover plants that can survive amidst a warming climate and other challenges like the evolving resistance of pests and diseases to chemical controls. Increasingly, environmentalists and agricultural experts say it will be necessary to draw on both the wisdom of traditional farmers and the advances of modern agriculture to feed the world without destroying the planet.

"We're talking about the foundation of civilization," says Foley. "We can't afford to let anyone in the world go hungry. Hungry countries are unstable countries — places that could be very dangerous to the whole world." ■

Notes

[1] "Bouazizi," *Time*, Jan. 21, 2011, www.time.com/time/magazine/article/0,9171,2044723,00.html.

[2] World Bank, "Middle East and North Africa: Agriculture and Rural Development," 2008, http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/MENAEXT/0,,contentMDK:20528258~pagePK:146736~piPK:226340~theSitePK:256299,00.html.

[3] Rami Zurayk, "Use your Loaf," *The Observer*, July 17, 2011, www.guardian.co.uk/lifeandstyle/2011/jul/17/bread-food-arab-spring.

[4] "The News Hour," PBS, Sept. 7, 2011, "Did Food Prices Spur Arab Spring?" www.pbs.org/newshour/updates/world/july-dec11/food_09-07.html.

[5] "Putin Says No Grain Exports Before 2011 Harvest," Reuters, Sept. 2, 2010, www.reuters.com/article/2010/09/02/us-russia-grain-idUSTRE68125J20100902.

[6] "Bread and Protests: The Return of High Food Prices," International Institute for Strategic Studies, March 2011, www.iiss.org/publications/strategic-comments/past-issues/volume-17-2011/march/bread-and-protests-the-return-of-high-food-prices/mobile-edition/?locale=en.

[7] For background, see Roland Flamini, "Turmoil in the Arab World," *CQ Global Researcher*, May 3, 2011, pp. 209-236.

[8] "Bread and Protests: The Return of High Food Prices," *op. cit.*

[9] "Chinese Hunger for Corn Stretches Farm Belt," *The Wall Street Journal*, Aug. 17, 2011, http://online.wsj.com/article/SB10001424053111903559490457646030015568176O.html.

[10] World Bank, "Food Price Watch," February 2011, www.worldbank.org/foodcrisis/food_price_watch_report_feb2011.html. Note: This increase occurred between June-December 2010.

[11] These are USDA projections for the 2010/11 growing season, cited in World Bank, *op. cit.* The EPA recently approved plans to allow the use of 15 percent ethanol in newer cars. For the rule see www.epa.gov/otaq/regs/fuels/additive/e15/index.htm#waiver. By law, the corn ethanol share of motor fuel must rise to 15 billion gallons by 2015. See Reuters, "Corn dominance to bend, not break," Sept. 30, 2011, http://us.mobile.reuters.com/article/environmentNews/idUSTRE78T3CO20110930.

[12] Alan Bjerga, *Endless Appetites* (2011), p. 78.

[13] The G-20 is an economic forum for a group of 20 industrialized and developing countries.

[14] Food and Agriculture Organization, *et al.*, "Price Volatility and Agricultural Markets: Policy Responses," Policy report to the G20, June 2, 2011, p. 15. Demand is projected to increase between 70 and 100 percent by 2050, while world population will increase from the current 7 billion to 9 billion, www.oecd.org/document/20/0,3746,en_2649_37401_48152724_1_1_1_37401,00.html.

[15] Worldwatch Institute, "State of the World 2011: Innovations that Nourish the Planet," 2011, p. 61.

[16] Jonathan A. Foley, "Can We Feed the World & Sustain the Planet?" *Scientific American*, November 2011.

[17] For background, see Doug Struck, "Disappearing Forests," *CQ Global Researcher*, Jan. 18, 2011, pp. 27-52.

[18] Gregory Meyer, "U.S. Ethanol Refiners Use More Corn than Farmers," *Financial Times*, July 12, 2011, www.ft.com/cms/s/0/77dfcd98-ac9f-11e0-a2f3-00144feabdc0.html#axzz1ZhlruBdj. Ethanol will use 40 percent of the corn crop from the 2010-11 growing season, which ended Aug. 31, 2011, according to USDA. Also see, David Biello, "Intoxicated on Independence: Is Domestically Produced Ethanol

Worth the Cost?" *Scientific American*, July 28, 2011, www.scientificamerican.com/article.cfm?id=ethanol-domestic-fuel-supply-or-environmental-boondoggle&print=true.

[19] Meyer, *op. cit.*

[20] Biello, *op. cit.*

[21] Javier Blas and Chris Flood, "Heavy U.S. Rains to Lower Corn Yields," *Financial Times*, June 10, 2011, www.ft.com/cms/s/0/b5a41a66-3714-11dd-bc1c-0000779fd2ac.html#axzz1ZhlruBdj.

[22] "Meals per Gallon," ActionAid, January 2010, p. 10, www.actionaid.org.uk/doc_lib/meals_per_gallon_final.pdf.

[23] "Price Volatility in Food and Agricultural Markets: Policy Responses," *op. cit.*, p. 27.

[24] Javier Blas, "G20 Attacked on Food Crisis Plan," *Financial Times*, June 23, 2011, www.ft.com/cms/s/0/aca4d56a-9da8-11e0-b30c-00144feabdc0.html#axzz1ZuYetBKA.

[25] Bruce A. Babcock, "The Impact of U.S. Biofuel Policies on Agricultural Price Levels and Volatility," International Centre for Trade and Sustainable Development, June 2011, Issue Paper No. 35, p. viii, http://ictsd.org/downloads/2011/06/babcock-us-biofuels.pdf. The 17 percent is the average result across 500 alternative future scenarios for 2011-12, modeled with varying supply/demand conditions, Babcock explained in an interview.

[26] Murray Worthy, "Broken Markets: How financial market regulation can help prevent another global food crisis," World Development Movement, September 2011, www.wdm.org.uk/stop-bankers-betting-food/broken-markets-how-financial-regulation-can-prevent-food-crisis. Also see Peggy Hollinger and Javier Blas, "French Anger at Speculators Hits G20 Hopes," *Financial Times*, Feb. 3, 2011, www.ft.com/cms/s/0/d487b732-2efe-11e0-88ec-00144feabdc0.html#axzz1ZALNA6Sb. Also see: Olivier de Schutter, "Food Commodities Speculation and the Food Price Crises: Regulation to reduce the risks of price volatility," U.N. Special Rapporteur on the Right to Food, September 2010, www.srfood.org/index.php/en/component/content/article/894-food-commodities-speculation-and-food-price-crises.

[27] Worthy, *op. cit.*

[28] De Schutter, *op. cit.*, p. 3.

[29] Lester Brown, "The Great Food Crisis of 2011," *Foreign Policy*, Jan. 10, 2011, www.foreignpolicy.com/articles/2011/01/10/the_great_food_crisis_of_2011. The number of additional diners each day cited in the article is 219,000.

[30] "Price Volatility in Food and Agricultural Markets: Policy Responses," *op. cit.*, p. 10. FAO estimates that the global demand for food will increase between 70 and 100 percent by 2050.

[31] Brown, *op. cit.*

[32] Monsanto, "Producing More," www.monsanto.com/ourcommitments/Pages/sustainable-agriculture-producing-more.aspx.

[33] Derek Headey and Shenggen Fan, "Reflections on the Global Food Crisis," International Food Policy Research Institute, 2010, p. 4, www.ifpri.org/publication/reflections-global-food-crisis.

[34] Brown, *op. cit.*

[35] For background, see Peter Katel, "Food Safety," *CQ Researcher*, Dec. 17, 2010, pp. 1037-1060; and David Hosansky, "Biotech Foods," *CQ Researcher*, March 30, 2001, *CQ Researcher*, 11, pp. 249-272.

[36] Jonathan A. Foley, "Can We Feed the World & Sustain the Planet?" *Scientific American*, November 2011.

[37] *Ibid.*

[38] *Ibid.*

[39] Headey and Fan, *op. cit.*, p. 82.

[40] *Ibid.*

[41] Michael Roberts and Wolfram Schlenker, "Identifying Supply and Demand Elasticities of Agricultural Commodities: Implications for the U.S. Ethanol Mandate," National Bureau of Economic Research, 2011. The United States produces roughly 23 percent of the four major grains worldwide, www.nber.org/digest/aug10/w15921.html.

[42] Niall Ferguson, *The Ascent of Money* (2008), pp. 226-227.

[43] de Schutter, *op. cit.*, p. 6.

[44] For background, see the following *CQ Researchers*: Kenneth Jost, "Financial Crisis," May 9, 2008, pp. 409-432; Marcia Clemmitt, "Mortgage Crisis," Nov. 2, 2007, pp. 913-936; and David Masci, "Stock Market Troubles," Jan. 16, 2004, pp. 25-48.

[45] de Schutter, *op. cit.*

[46] "State of the World 2011," *op. cit.*, p. 30, 133-134.

[47] Headey and Fan, *op. cit.*, p. 86.

[48] For background, see Marcia Clemmitt, "Global Food Crisis," *CQ Researcher*, June 27, 2008, pp. 553-576.

[49] Vaclav Smil, "China's Great Famine: 40 Years Later," BMJ, Dec. 18, 1999, www.bmj.com/content/319/7225/1619.full.

[50] Worldwatch Institute, *op. cit.*, p. 13.

[51] Askold Krushelnycky, "Stalin's Starvation of Ukraine," Radio Free Europe/Radio Liberty, 2003, www.ukemonde.com/news/rferl.html. Also see, www.historyplace.com/worldhistory/genocide/stalin.htm.

[52] Bjerga, *op. cit.*, pp. 65-66. Also see, "Another Soviet Grain Sting," *Time*, Nov. 26, 1977, www.time.com/time/magazine/article/0,9171,919164,00.html.

[53] "Food Security in the Russian Federation," Food and Agriculture Organization, www.fao.org/docrep/007/y5069e/y5069e03.htm.

[54] Bjerga, *op. cit.*, p. 66.

[55] William M. Liefert, *et al.*, "Russia's Transition to Major Player in World Agricultural Markets," *Choices*, second quarter 2009, www.choicesmagazine.org/magazine/article.php?article=78.

[56] "Agricultural Policy Monitoring and Evaluation 2011," Organisation for Economic Co-operation and Development, 2011, p. 213, www.oecd.org/document/32/0,3746,en_2649_37401_48625184_1_1_1_37401,00.html.

[57] "The Miracle of the Cerrado," *The Economist*, Aug. 26, 2010, www.economist.com/node/16886442.

[58] Headey and Fan, op. cit., p. 89.

[59] Justin Gillis, "A Warming Planet Struggles to Feed Itself," *The New York Times*, June 4, 2011, www.nytimes.com/2011/06/05/science/earth/05harvest.html?_r=3&ref=todayspaper&pagewanted=print.

About the Author

Sarah Glazer, a London-based freelancer, is a regular contributor to *CQ Global Researcher*. Her articles on health, education and social-policy issues also have appeared in *The New York Times* and *The Washington Post*. Her recent *CQ Global Researcher* reports include "Radical Islam in Europe" and "Social Welfare in Europe." She graduated from the University of Chicago with a B.A. in American history.

[60] Bjerga, *op. cit.*, p. 22.
[61] For most of 2011 corn prices were above $7 a bushel but fell to $5.75 in early October. See Dan Piller, "Corn's Fall Continues," Oct. 3, 2011, *Des Moines Register*, http://blogs.desmoinesregister.com/dmr/index.php/2011/10/03/corns-fall-continues/.
[62] *Ibid.*
[63] Gillis, *op. cit.*
[64] *Ibid.*
[65] Headey and Fan, *op. cit.*, p. 89.
[66] "Anti-government rioting spreads in Cameroon," *The New York Times*, Dec. 7, 2008, www.nytimes.com/2008/02/27/world/africa/27iht-27cameroon.10504780.html. Also See "Meals per Gallon," *op. cit.*, p. 14. Overall, world food prices increased by 75 percent. But the price for staple food grains like corn, rice and wheat jumped even more — on the order of 126 percent. For background, see Clemmitt, *op. cit.*
[67] Bjerga, *op. cit.*, p. 66.
[68] "Mass Arrests Over Mozambique Food Riots," BBC, Sept. 6, 2010, www.bbc.co.uk/news/world-africa-11198444. Also See, "Mozambique Bread Riots Spread as Police Shoot Protesters Dead," *Guardian*, Sept. 2, 2010, www.guardian.co.uk/world/2010/sep/02/mozambique-bread-riots-looters-dead?intcmp=239. Also see Bjerga, *op. cit.*, p. 68.
[69] "FAO Food Price Watch," Food and Agriculture Organization, Oct. 6, 2011, www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/.
[70] de Schutter, p. 6. The act (PL 111-203) was signed July 21, 2010.
[71] Josh Boak, "Wall Street Strikes at Regulations," *Politico*, July 10, 2011, www.politico.com/news/stories/0711/58644.html.
[72] *Ibid.*
[73] "Datablog: Meat Consumption per Capita," *Guardian*, Sept. 2, 2009, www.guardian.co.uk/environment/datablog/2009/sep/02/meat-consumption-per-capita-climate-change.
[74] For background, see Jina Moore, "Resolving Land Disputes," *CQ Global Researcher*, Sept. 6, 2011, pp. 421-446; and Karen Foerstel, "China in Africa," *CQ Global Researcher*, Jan. 1, 2008, pp. 1-26.
[75] Jesse Chang, "Meat Production and Consumption Continue to Grow," Vital Signs, Worldwatch Institute, Oct. 11, 2011, www.worldwatch.org/node/9055.
[76] Headey and Fan, *op. cit.*
[77] "Agricultural Policy Monitoring and Evaluation 2011," *op. cit.*, p. 223.

FOR MORE INFORMATION

ActionAid International, 41 Rue du Commerce, 1000, Brussels, Belgium; 32 2502 40 28; www.actionaid.org/eu. Network of community groups around the world that advocates for rights for the poor; has been particularly active in reporting on "land grabs" by foreign biofuels companies that displace people in developing countries.

Earth Policy Institute, 1350 Connecticut Ave., N.W., Suite 403, Washington, DC 20036; 202-496-9290; www.earth-policy.org. An environmental organization founded by Lester Brown, an agricultural economist and expert on international agriculture, who has been called the guru of the global environmental movement.

Food and Agriculture Organization of the United Nations (FAO), Viale delle Terme di Caracalla, 00153 Rome, Italy; 39 06 57051; www.fao.org. A 191-member international organization that provides information about global food prices and supplies; focuses on improving nutrition levels and agricultural productivity.

Institute of International Finance, 1333 H St., N.W., Suite 800E, Washington, DC 20005-4770; 202-857-3600; www.iif.com. Represents world's largest banks and financial institutions in 70 countries; active on commodity speculation regulation.

International Food Policy Research Institute, 2033 K St., N.W., Washington, DC 20006; 202-862-5600; www.ifpri.org. Seeks sustainable solutions for ending hunger and poverty; one of 15 centers supported by the Consultative Group on International Agricultural Research, an alliance of 64 governments, private foundations and international and regional organizations.

Oxfam International, Suite 20, 266 Banbury Road, Oxford OX2 7DL, United Kingdom; 44 1865 339 100; www.oxfam.org. International confederation of 15 organizations working in 98 countries to find solutions to poverty and injustice.

Renewable Fuels Association, 425 Third Street, S.W., Suite 1150, Washington, DC 20024; 202-289-3835; www.ethanolrfa.org. Trade association for the renewable fuels industry in the United States.

World Development Movement, 66 Offley Road, London SW9 0LS, United Kingdom; +44 20 7820 4900; www.wdm.org.uk. Activist group working to defeat world poverty; [advocates ok???] commodities speculation regulation.

Worldwatch Institute, 1776 Massachusetts Ave., N.W., Washington, DC 20036; 202-452-1999; www.worldwatch.org. Independent research institute devoted to analyzing environmental issues of global concern.

[78] "Chinese Hunger for Corn Stretches Farm Belt," *The Wall Street Journal*, Aug. 17, 2011, *op. cit.*
[79] David B. Lobell, Wolfram Schlenker and Justin Costa-Roberts, "Climate Trends and Global Crop Production Since 1980," *Science*, July 29, 2011, pp. 616-620, www.sciencemag.org/content/early/2011/05/04/science.1204531.abstract.
[80] "Renewable Fuel Standard: Potential Economic and Environmental Effects of U.S. Biofuel Policy," National Research Council, 2011, p. 5, http://download.nap.edu/catalog.php?record_id=13105.
[81] James Kanter, "Serious Error Found in Carbon Savings for Fuels," Green Blog, *The New York Times*, Sept. 14, 2011, http://green.blogs.nytimes.com/2011/09/14/serious-error-found-in-carbon-savings-for-biofuels/. Also See: www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view.

Bibliography

Selected Sources

Books

Bjerga, Alan, *Endless Appetites: How the Commodities Casino Creates Hunger and Unrest*, Bloomberg Press, 2011.

The agricultural policy reporter for Bloomberg News explains the recent growth of commodities speculators in this fast-paced, entertaining account of the latest world food crises.

Worldwatch Institute, "State of the World Report 2011," Norton, 2011, www.worldwatch.org/sow11.

A collection of essays by experts, gathered by a Washington, D.C.-based environmental research organization, describes how the rediscovery of native vegetables and ecological farming methods in 25 sub-Saharan African countries is improving output.

Articles

Brown, Lester, "The Great Food Crisis of 2011," *Foreign Policy*, Jan. 10, 2011, www.foreignpolicy.com/articles/2011/01/10/the_great_food_crisis_of_2011.

Rising food prices and riots in the Middle East signal a broader environmental crisis that will make it harder to grow enough food, according to this environmentalist.

Foley, Jonathan A., "Can We Feed the World & Sustain the Planet?" *Scientific American*, November 2011, pp. 34-37.

University of Minnesota environmental scientist Foley explains how world food production could be doubled by 2050 without destroying the planet.

Gillis, Justin, "A Warming Planet Struggles to Feed Itself," *The New York Times*, June 4, 2011.

Scientists worry that warming temperatures from climate change will make it difficult to meet world food demand.

Kilman, Scott and Brian Spegele, "Chinese Hunger for Corn Stretches Farm Belt," *The Wall Street Journal*, Aug. 17, 2011, http://online.wsj.com/article/SB10001424053111903554904576460300155681760.html.

A surprise purchase of U.S. corn by China this summer raised speculation that the giant Asian country could become the largest importer of American corn as the Chinese appetite for meat grows.

Lobell, David B., Wolfram Schlenker and Justin Costa-Roberts, "Climate Trends and Global Crop Production Since 1980," *Science*, July 29, 2011, pp. 616-620, www.sciencemag.org/content/333/6042/616.full.html.

Researchers from Stanford and Columbia estimate that rising temperatures due to climate change have already reduced crop yields over the past 30 years in France, Russia, China and other countries.

Runge, C. Ford, "The Case against Biofuels: Probing Ethanol's Hidden Costs," *Yale Environment 360*, 11 March 2010, http://e360.yale.edu/feature/the_case_against_biofuels_probing_ethanols_hidden_costs/2251/.

A University of Minnesota professor of applied economics and law traces the U.S. ethanol industry's expansion since the powerful Midwestern farm lobby obtained government biofuel subsidies, which he says hurt both the environment and food prices for the poor.

Reports

"Financial Investment in Commodities Markets: Potential Impact on Commodity Prices and Volatility," Institute of International Finance, September 2011, www.iif.com/press/press+204.php.

This global association of large banks and investment managers counters the charge that new commodities speculators have boosted food prices and made them more volatile.

"Meals Per Gallon: The Impact of Industrial Biofuels on People and Global Hunger," ActionAid, 2010, www.actionaid.org.uk/doc_lib/meals_per_gallon_final.pdf.

European policies to expand biofuels production are pushing small farmers off their land and raising food prices in developing countries, according to this report from a Johannesburg-based group devoted to reducing global hunger and poverty.

"Price Volatility in Food and Agricultural Markets: Policy Responses," Food and Agriculture Organization, *et al.*, June 2, 2011, www.oecd.org/document/20/0,3746,en_2649_37401_48152724_1_1_1_37401,00.html.

This report, prepared for the G-20, blames government biofuel mandates for driving up world food prices but says the jury is still out on whether commodities speculation also was boosting prices.

Headey, Derek and Shenggen Fan, "Reflections on the Global Food Crisis," International Food Policy Research Institute, Nov. 18, 2010, www.ifpri.org/pressroom/briefing/reflections-global-food-crisis.

An independent research institute blames the 2008 food crisis on rising energy costs, biofuels expansion, export restrictions and bad weather — not meat-eating in China.

Worthy, Murray, "Broken Markets: How Financial Market Regulation Can Help Prevent Another Global Food Crisis," World Development Movement, 2011, www.wdm.org.uk/stop-bankers-betting-food/broken-markets-how-financial-regulation-can-prevent-food-crisis.

This report from a London-based anti-poverty group blames the latest food crisis on commodities speculators.

The Next Step:

Additional Articles from Current Periodicals

African Famine

Gettleman, Jeffrey, "U.N. Officials Say Famine Is Widening in Somalia," *The New York Times*, Sept. 6, 2011, p. A4, www.nytimes.com/2011/09/06/world/africa/06somalia.html.

Lower agricultural production and soaring food prices have contributed to widespread famine in Somalia, according to the United Nations.

Islam, Rafiqul, "Famine in East Africa," *United News of Bangladesh*, July 29, 2011.

Eastern Africa is experiencing the most severe food crisis in the world today due to a lack of water and high food prices.

Mariam, Alemayehu G., "Meles Zenawi and the Weaponization of Famine," *Ethiomedia* (Ethiopia), Aug. 8, 2011, www.ethiomedia.com/andnen/2776.html.

Manipulators of food prices are causing a widespread famine in Ethiopia that is being used as a political tool, according to a political science professor.

Biofuels

Evans, Alex, "Counting the Real Cost of Biofuels," *Guardian Unlimited* (England), May 31, 2011.

Several international organizations have adopted guidelines for producing biofuels in ways that don't add to global warming or affect food prices.

Rosenthal, Elisabeth, "Rush to Use Crops As Fuel Raises Food Prices and Hunger Fears," *The New York Times*, April 7, 2011, p. A1, www.nytimes.com/2011/04/07/science/earth/07cassava.html.

Many experts are calling on countries to scale back their biofuel development in response to high food prices.

Zaman, Samihah, "Biofuel Crops Will Not Increase Food Prices, Shortages," *Gulf News* (United Arab Emirates), Jan. 21, 2011, gulfnews.com/business/general/biofuel-crops-will-not-increase-food-prices-shortages-1.749692.

Government officials in the United Arab Emirates don't believe that increasing biofuel crops will create food shortages or price spikes.

Farmers

Brasher, Philip, "Jump in Profits for Food Crops Can Jeopardize Poor Countries," *Des Moines* (Iowa) *Register*, Feb. 4, 2011, p. B7.

Soaring food prices have proved beneficial for American farmers but have raised concerns about the impact on poor people in other countries.

Bugaari, Ambrose, "Despite Rising Prices, Farmers Still Earn Peanuts," *The Monitor* (Uganda), March 30, 2011, allafrica.com/stories/201103300030.html.

Ugandan farmers have yet to reap the full benefits of rising food prices, due in part to a lack of production capacity.

Crumb, Michael J., "Experts: Farmers Not to Blame for High Food Prices," The Associated Press, April 4, 2011, www.huffingtonpost.com/2011/04/04/farmers-blame-high-food-prices_n_844405.html.

Farmers and ethanol producers should not be blamed for high food prices, according to some experts.

Speculation

"Fears Rise Over Banks' Agricultural Trading," *Daily Telegraph* (England), May 2, 2011.

With humanitarian officials becoming increasingly worried over rising food prices, banks are coming under a harsh spotlight for their agricultural trading.

Asrianti, Tifa, "Global Food Speculation 'Driving Up' Prices," *Jakarta* (Indonesia) *Post*, May 13, 2011, www.thejakartapost.com/news/2011/05/13/global-food-speculation-'driving-up'-prices.html.

The Indonesia Farmers Union says international food-price speculation has encouraged staple food sellers to hold onto their stocks, which has pushed up prices.

Morgenson, Gretchen, "Speculators Get a Break in New Rule," *The New York Times*, Sept. 25, 2011, p. BU1, www.nytimes.com/2011/09/25/business/economy/new-rule-gives-commodities-speculators-a-break.html.

A Senate panel has concluded that skyrocketing wheat prices are reflected in high levels of financial speculation in wheat.

Citing *CQ Global Researcher*

Sample formats for citing these reports in a bibliography include the ones listed below. Preferred styles and formats vary, so please check with your instructor or professor.

MLA Style

Flamini, Roland. "Nuclear Proliferation." CQ Global Researcher 1 Apr. 2007: 1-24.

APA Style

Flamini, R. (2007, April 1). Nuclear proliferation. *CQ Global Researcher*, 1, 1-24.

Chicago Style

Flamini, Roland. "Nuclear Proliferation." *CQ Global Researcher*, April 1, 2007, 1-24.

Voices From Abroad:

HASSAN ZAMAN
Lead Economist, Poverty Reduction and Equity Group, World Bank

More than just agriculture

"Food security is about much more than food or agriculture. It's about ensuring adequate and nutritious food for every member of the household. This requires that people can afford to purchase nutritious food and so is clearly linked to income growth, particularly for the poor."

Pakistan Press International
February 2011

ABDOLREZA ABBASSIAN
Food Economist Food and Agriculture Organization United Nations

More important to others

"High food prices are of major concern especially for low-income food deficit countries that may face problems in financing food imports and for poor households which spend a large share of their income on food. The only encouraging factor so far stems from a number of countries, where — due to good harvests — domestic prices of some food staples remain low compared to world prices."

This Day (Nigeria), February 2011

ALA'A AL DEEN MOUSA
Senior Researcher Department of Economic Development United Arab Emirates

Buffering prices

"For a country [United Arab Emirates] that imports so much of its food, a buffer stock is extremely crucial for times of crisis. Such stocks could even be used to absorb the shock of current high prices."

Gulf News (United Arab Emirates), March 2011

JOSETTE SHEERAN
Executive Director, World Food Program, United Nations

A reality for all

"We are on red alert, and we are continually assessing needs and reassessing plans and stand ready to assist. Rising food prices are a reality for the whole world, but they have the biggest impact on the poorest and most vulnerable populations."

UzReport (Uzbekistan)
February 2011

NAZMEERA MOOLA
Director, Macquarie Bank, South Africa

Biofuel's drawback

"Estimates suggest biofuels have the potential to provide up to 27 percent of world transportation fuel by 2050. Unfortunately, biofuels often have a pernicious side-effect. They take food away from poor people by driving up the price of grains. Soaring food prices are far more disturbing to global political stability than rising energy prices. Ask many of the strongmen of the Middle East, or Marie Antoinette."

Financial Mail (South Africa)
June 2011

DZULKIFLI ABDUL RAZAK
Vice Chancellor, Universiti Sains, Malaysia

A narrow focus

"Agricultural development focuses narrowly on increasing productivity rather than on the broader food and nutritional security of people. After all, freedom from hunger is the first requisite for sustainable human security."

New Straits Times (Malaysia)
October 2011

JUDITH ROBERTSON
Director, Oxfam, Scotland

Hunger and history

"The food system must be overhauled if we are to overcome the increasingly pressing challenges of spiraling food prices, climate change and the scarcity of land, water and energy. We must consign hunger to history."

The Herald (Scotland)
June 2011

ROBERT ZOELLICK
President, World Bank

Putting food first

"More poor people are suffering and more people could become poor because of high and volatile food prices. We have to put food first and protect the poor and vulnerable, who spend most of their money on food."

Guardian Unlimited (England)
April 2011

The Khaleej Times, UAE/Paresh Nath