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A Future of Price Spikes

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Thomas Malthus lived in an era much like today's — when emerging technologies made anything seem possible. The 19th century was approaching, the Industrial Revolution was steaming along, and in intellectual circles it was popular to believe that expanding scientific knowledge could create a more enlightened, even utopian, society.

Malthus, however, was making a more dire calculation. In 1798 he published *An Essay on the Principle of Population*, whose grim vision of the future haunts mankind to this day. Malthus thought we could never overcome two basic laws of nature: the planet's population grows exponentially, while food production increases arithmetically. Therefore the planet will become short on food. "The power of population is indefinitely greater than the power in the earth to produce subsistence for man," he contended. The "natural inequality" between these two forces "appears insurmountable in the way to the perfectibility of society." Inevitably, the result would be "misery and vice." (See pictures of the global food crisis.)

Taking a look around us today, it would be easy to conclude that Malthus was prescient. Food prices are near historic highs, driven upward by an ever larger, ever hungrier population. Every report of drought or flooding raises fears of global shortages. About 925 million people go to bed hungry every night. And every day we add 219,000 mouths to feed, while the land, water and other resources needed to produce additional food edge closer to their apparent limits. This intensifying "natural inequality" leaves some experts sounding like modern-day Malthuses. "No civilization has ever survived the ongoing destruction of its natural support system," says Lester Brown, president of the Earth Policy Institute. "And neither will ours."

So was Malthus right? Not exactly. Even though the world's population has increased about sevenfold since his time, food production has more or less kept pace, at least enough that we don't suffer mass starvation. (Millions have starved for political reasons.) Nevertheless, the global food industry is at a crucial point. In the 2010-11 season, we consumed more grain than we produced, and food prices rose dramatically as a result. Globally, food costs 39% more today than just a year ago, according to the U.N.'s Food and Agriculture Organization (FAO). Grain reserves are in decline relative to our needs.

Yes, last year's global harvest was reduced by bad weather, but the problem isn't going away. Deep historical trends — the shift of economic power from West to East and the quest for new, cleaner sources of energy — are permanently reshaping the way the world consumes food. The FAO projects that food production must increase 70% by 2050 to meet the growing demand of an expanding population. Ensuring that we have sufficient food at prices we can afford is one of the most pressing and potentially volatile issues facing the global community. "The world really has to sit up and pay attention," says Ngozi Okonjo-Iweala, a managing director of the World Bank. "The food security problem is a global security problem." (See pictures of food, from farm to fork.)

Seeds of Disaster

Ironically, the roots of our food crisis lie in what is otherwise a great leap forward for humanity: the alleviation of poverty in the developing world. As the poor in China, India and other emerging economies escape destitution, they can afford to load up their plates more than ever. Grain consumption in the developing world has increased 80% over the past 30 years, compared with a rise of only 22% in the advanced economies. And, more important, the nouveaux riches of Beijing



and Rio de Janeiro are changing their diets, adding more meat and other luxuries that were once out of their financial reach.

The amount of meat each person consumes has doubled over the past three decades. That puts extra pressure on agriculture. To raise enough cows and pigs to supply the steaks and chops people demand, corn and other grains are diverted from people to animals. On a U.S. feedlot, it can take about 6 kilos of grain to produce 1 kilo of beef, plus thousands of liters of water. Adding to the increased demand for corn is the growing popularity of biofuels. In 2000 only 6% of America's corn harvest was used to manufacture ethanol; now about 40% is — enough to feed at least 350 million people, according to the Earth Policy Institute.

See "Impending Crisis: Earth to Run Out of Food by 2050?"

With demand steadily rising, the world is closer to disaster because the food safety net has shrunk. In the late 1990s, we had enough corn stashed in reserve to meet world demand for about four months; now we have enough for only about 12/3. From more than four months' supply of wheat in storage, we have gone down to just over three (and in recent years, reserves have fallen even further).

That's made global food markets susceptible to ever more extreme price spikes caused by floods, droughts and other unpredictable acts of Mother Nature. Wheat prices soared last summer when wildfires and drought destroyed a third of Russia's grain crop, while corn prices reached dizzying heights in part because of a weak harvest in the U.S. "There's not much of a cushion to deal with any kind of shocks, and shocks are what we're getting," says Soozhana Choi, head of commodities research for Asia at Deutsche Bank in Singapore. (See pictures of what the world eats.)

High food prices are bad news for everyone. Rising prices have stoked inflation in China and India, forcing their central banks to hike interest rates to dampen growth. Because emerging markets have been driving the global recovery, slower growth in China and India is a drag on the world economy. Bigger grocery bills also hurt growth by eating into consumer spending. As a larger portion of people's paychecks is spent on bread and beef, less is left to buy LCD TVs, cars and plane tickets.

The pain caused by expensive food is especially severe for the poor. Low-income families in Africa and elsewhere tend to spend a majority of what they earn on food, so high prices make them poorer, hungrier or both. The World Bank estimates that 44 million people in the developing world have been thrown back into poverty by recent price increases. In the village of Saddarpur, not far from New Delhi, food has become so pricey that Nimmi Singh, a domestic helper, had to triple the number of houses she cleans to bring in extra rupees. "We have a hand-to-mouth existence anyway," Singh complains. Now "the markets are totally untouchable."

Although commodity prices have retreated from their highs, prices overall are expected to remain much higher than they were in the past. "All the factors that cause food-price spikes are going to continue into the future," says Jay Naidoo, chair of the Global Alliance for Improved Nutrition, "and it's going to get worse." In a June report, the FAO and the Organisation for Economic Co-operation and Development (OECD) estimated that cereal prices will rise as much as 20% and meat prices up to 30% over the course of this decade compared with the previous one. "We talk scarcenomics," says Craig Cogut, founder of Pegasus Capital Advisors, a New York City — based private-equity firm. "When you look at food and water and energy, you see rising populations and resources becoming scarcer. Rising food prices are a fact of life." Pegasus has invested in a joint venture that sells organic and antibiotic-free chicken and turkey. (See pictures of Ethiopia on the brink of starvation.)

Another Green Revolution



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So avoiding the malthusian conclusion rests, as ever, on our ability to invent ways to exploit our planet's limited resources more effectively. During the green revolution of the 1960s and '70s, technologically advanced high-yield seeds and investments in irrigation systems and other infrastructure spawned huge increases in food production. The problem is that as prices fell, policymakers starved the world's farmers of investment and aid, depriving them of the tools they needed to produce more food. Some 60% of the farms in India still have no access to irrigation, for example, leaving them dependent on the erratic annual monsoon.

Funds to develop new technologies also dried up. Middle- and low-income countries allocated 20% of R&D spending to agriculture in 1982, but by 2000 the share had slipped to 12%. As a result, farms have become less productive. The FAO-OECD report projects that global agricultural production will grow 1.7% a year on average from 2011 to 2020, compared with 2.6% during the previous decade.

What we need is a new green revolution. That will require money — lots of it. Governments in India, Senegal and other emerging economies have already started spending more on agriculture in a new quest for food security, but those increases are insufficient. The FAO estimates that more than \$200 billion in agricultural investment is required each year in the developing world to meet food demand — a hefty 50% increase from current levels.

See "Back to the Land: The New Green Revolution."

In addition, we need better technology. Our only way out of the crisis is to develop hardier, more productive seeds, new techniques to conserve dwindling water resources and other sustainable innovations. Even simple improvements can make a huge difference, especially for poor, small-scale farmers, whose productivity is still low. Agricultural giant Syngenta, for example, has developed a system for rice farmers that combines specially prepared seedlings and mechanized planting to produce up to 30% more per paddy with the same amount of water. "We have the technology and resources to solve the problem," says Hafez Ghanem, assistant director-general of the FAO in Rome. "What is needed is the political will."

Food markets require fixing as well. There is no comprehensive source of information on global production and reserves of major food grains, which leaves traders and government officials guessing and sometimes jolts prices. The G-20 is attempting to solve this problem with an international data system for major commodities, which could reduce price volatility while allowing the market to do its job. (See pictures of urban farming.)

We also need to improve distribution, especially in poor nations. Too much food simply rots in the countryside because warehousing and transportation networks are lacking. In West Timor in Indonesia, for example, an NGO gave farmers seeds for cashew trees about a decade ago, but they had little access to customers. In 2009 a group of Asian investors set up a processing plant in the area and began buying and marketing the cashews, providing cash for the poor farmers and nuts for the world — all for an investment of only \$500,000.

Economist Adam Smith, a more optimistic contemporary of Malthus', believed that free markets solve problems like food shortages. Scarcity signals opportunity, and that attracts investment, stimulates production and encourages innovation. We can see signs of that today. Responding to lofty prices, U.S. corn farmers this year planted the second largest amount of acreage since World War II. American ag giant Monsanto spent \$1.2 billion on R&D in its 2010 fiscal year, 54% more than in 2007. And with prices high, farmers have more reason to try the new stuff emerging from corporate labs. "What is a farmer going to do?" asks Syngenta CFO John Ramsay. "He is going to be incentivized to go for yields."



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Not everyone, however, thinks the profit motive is best for the future of food. Critics of agribusiness complain that it hooks farmers on expensive patented plant varieties and pushes potentially unsafe technologies like genetic modification. Organizations like the Consultative Group on International Agricultural Research support labs that are trying to develop better rice, maize and other grains. But these groups don't command the resources of the big firms. Nor can we easily dismiss what the industry invents. Biotech, whether environmentalists like it or not, may have to be part of the food solution. "It may be a politically contentious discussion, but we simply don't have the luxury to abandon a potential tool like biotech," says Charles Godfray, a population biologist at the University of Oxford. (See how to end the global food shortage.)

Yet even these improvements may not be sufficient. Farmers will confront unprecedented challenges in the years ahead. Some studies suggest that climate change could alter agricultural areas in large swaths of the developing world. The U.N.'s Intergovernmental Panel on Climate Change has projected that a temperature increase of 3°C could raise the price of food by 40%. Nor can we count on the intensive use of water to propel future gains in output, as we have in the past. While many Indian farmers do without irrigation, half the world's population lives in areas where water tables are falling as a result of excessive irrigation. How we manage our freshwater resources will be key to solving the food problem.

For 200 years Malthus has been wrong because he underestimated human ingenuity in overcoming the limitations of our environment. But there's no guarantee we will continue to do so, at least if we remain on our present course. The story of food is a cautionary one about the consequences of neglecting what truly affects life and death. "It's quite possible that we've passed a tipping point and we haven't realized it yet," says Brown of the Earth Policy Institute. Enjoy your dinner tonight. While you can still afford it.

—with reporting by Bryan Walsh / New York, Tim Padgett / Miami and Jyoti Thottam and Nilanjana Bhowmick / New Delhi

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