World grain markets tightened sharply in 1995, bringing Malthusian worries back into fashion. A weather-related drop in corn production in the United States combined with strong worldwide demand to push U.S. corn export prices up 45 percent in a single season. Corn and wheat prices on the Chicago Board of Trade jumped to a 15-year high. Both the United States and the European Union stopped subsidizing wheat exports, and the EU even imposed export taxes to guard against shortages at home. The U.N. Food and Agriculture Organization (FAO) projected that world grain stocks would fall, before a new harvest came in, to between 14 percent and 15 percent of annual consumption, the lowest level in two decades, and much less than the 17 percent to 18 percent level the organization considers safe.

Lester R. Brown, president of Worldwatch Institute, believes these short-term changes may be the leading edge of a disturbing scenario: world grain shortages caused by the growing imports of China. In *Who Will Feed China? Wake-Up Call for a Small Planet*, Brown calculates that by the year 2030 China's need for grain imports will far outstrip the spare production capacity of exporting nations. International prices will then skyrocket, imperiling consumers in poor importing countries. This scenario seemed to be unfolding ahead of schedule last year, when China, already the world's largest importer of wheat, switched from being an exporter to an importer of corn.
The result has been a flurry of speculation about the trouble facing Chinese agriculture and the long-term consequences for the world food system. In China itself, even top leaders such as Premier Li Peng have expressed concern. Yet the most severe problems facing today’s world food system—and tomorrow’s—will not be in China, but in South Asia and Africa. Especially in Africa, which is plagued by poor government, slow economic growth, and rural environmental degradation, malnutrition is likely to increase in the decades ahead, whether or not prices rise in the international commercial marketplace.

**GRAIN PROSPECTS**

Brown forecasts continuous rapid growth in Chinese grain consumption, a reasonable expectation given the dietary enrichment likely to accompany high income growth in the country’s rapidly industrializing cities. Chinese consumers will demand more meat, eggs, and other livestock products, causing demand for animal feed to surge. But Brown is wrong to assume that grain producers in exporting nations and in China will be unable to meet this demand. He is also wrong to suggest that rising grain imports would be an indication of China’s weakness or failure. And he draws too strong a connection between international grain prices and localized chronic malnutrition.

Brown underestimates by a wide margin the capacity of farmers in China and worldwide to respond to higher prices with more production. His forecast of world grain output, which assumes ruinously high prices by 2030, projects only a modest average increase of half a percent annually in production. That is less than one-third the 1.6 percent annual increase projected by FAO, far less than half the 1.3 percent annual increase projected by the World Bank, and less than one-fifth the 2.6 percent annual increase actually registered between 1961 and 1990.

Why is Brown such a pessimist? He points to the 1970s, when world grain prices suddenly doubled, mainly due to high income growth rates and inflationary monetary policies throughout the industrial world. Prices for all commodities—including oil, copper, bauxite, and tin—increased sharply between 1972 and 1974 because of the same macroeconomic effects. Farmers everywhere responded by planting larger areas, using more water and fertilizer, switching to new varieties of seeds, and buying better equipment, all of which greatly boosted production. In the United States, the five-year average for annual wheat production climbed 60 percent from 1970–75 to 1980–85. Brown then dismisses this response by claiming it was not environmentally sustainable; he argues that American farmers planted too much marginal land and were forced to pull back when the soil eroded and profits fell. Not true. Profits for American farmers did decline sharply in the mid-1980s, and production subsequently turned down, but the reason was a drop in prices. Between 1974 and 1987, as macroeconomic conditions changed, the export price of wheat fell in real terms by more than two-thirds. Naturally production declined.

If the high world prices Brown foresees were to materialize, much higher production would quickly follow, and not just in the United States. Already in 1996, planted corn acreage in the United States is expected to be up by 13 percent, and Canada, Australia, the EU, Ukraine,
Rice Bowls and Dust Bowls

Argentina, South Africa, and many other agricultural exporters could respond as well. Dennis Avery of the Hudson Institute, a longstanding critic of Brown's bleak projections, has estimated that Argentina could convert 75 million acres of land with deep, fertile soil in the Pampas from pasture to grain production if grain prices sustained a rise over the long term. Brazil has more than 150 million acres of arable unplanted land in the central Cerrados Plateau. Over the 40-year period in Brown's scenario, there would be abundant opportunity to build railroads, install electrical capacity, and develop corn varieties tolerant of the plateau's acidic soil, transforming the region into yet another grain belt, ready to meet world market demand.

Most astonishing is Brown's projection that China will suffer a 20 percent decline in grain production between 1990 and 2030. Again, he is badly out of step with mainstream expectations. The U.S. Department of Agriculture projects annual growth of about one percent in China's grain output in the years ahead. The International Food Policy Research Institute in Washington forecasts that Chinese wheat, corn, and rice production will increase by 90 percent, 80 percent, and 54 percent, respectively, by the year 2020. Nikos Alexandratos, a specialist at FAO, has estimated China's production of cereals—wheat, corn, and rice—could rise 68 percent between 1990 and 2030, even if the area sown with cereal crops were to decline 12 percent.

Brown justifies his extraordinary pessimism about China by predicting a massive loss of land now used for growing grain—roughly half by 2030—through degradation or conversion to other uses. He argues that better crop yields will not be enough to offset the loss. This is misleading because switching from grain to high-value crops, such as vegetables, should be viewed as a gain for Chinese farmers, not a loss, and it is unjustified because it is based on an imperfect analogy to the experiences of countries such as Japan, Korea, and Taiwan. They converted land away from farming, including grain production, as their economies developed, but did so because they had fewer options for growth in agricultural production than China has today.

Brown's forecast of China's future crop yields is derived in part from Chinese government reports, which suggest current rice yields are already approaching Japan's output of roughly five tons per hectare—a high level that seems to leave little room for improvement. This is mistaken on two counts. The crop yields officially reported by the Chinese government are indeed high, yet they are known to be inflated to offset chronic underreporting of cropland area by farmers seeking to escape property taxes. Vaclav Smil, a professor at the University of Manitoba, estimates that actual yields for most crops in China are 15 to 20 percent lower than official figures, and for some crops nearly a third lower, which would put Chinese yields well below the Japanese level. Furthermore, the Japanese level of five tons per hectare is not the current limit. Since 1985 rice yields in the United States have exceeded six tons per hectare, South Korea's yields have approached seven tons per hectare, and Australian yields now exceed eight tons per hectare. Assuming investment in research, yield potentials will, in any case, continue to rise through the year 2030. In 1994, at
roughly the same time Brown was first making his argument, the International Rice Research Institute in the Philippines announced that it had developed a new strain of rice with a yield as much as 25 percent greater than existing varieties.

IS TRADE BAD?

*Who Will Feed China?* also raises issues of interpretation. When countries such as China, Japan, Taiwan, or South Korea turn to the world market for grain imports, the move should not be taken as evidence of a faltering agricultural sector or an inability to feed themselves. Their steadily increasing grain imports are affordable because they have positive trade balances and balance-of-payments accounts. Grain imports are also a proven path to improved domestic nutrition and food security and permit a wiser use of environmental resources.

Grain imports spur economic growth in East Asia by allowing importers to capitalize on their comparative advantage in economic activities other than grain production. Japan would be a poorer country today if the feed grain it needs to produce domestic poultry, pork, and beef supplies had to be grown domestically, where land is scarce and expensive, rather than purchased at low cost from countries such as the United States, Canada, and Argentina, where land is far more abundant. China is wise to pursue similar gains from trade.

Grain imports make more sense than plowing up more sloping, arid, infertile, and forested lands in rural China. Only by turning to the world market for grain will China save its depleted ground water from exhaustion and its scarce surface-level water resources from costly and environmentally unsustainable diversion.

Reliance on commercial grain imports is also a sound food and nutrition policy for China. Historically, threats to nutrition in China have come not from dependence on markets but from the actions of government officials who were unwilling to trust markets. In 1959-60 during the disastrous Great Leap Forward, when China was obsessed with self-sufficiency, the mismanagement of government grain procurement led to the deaths of an estimated 30 million Chinese peasants. The International Food Policy Research Institute has concluded that if China is willing to rely more on grain imports, the number of malnourished children nationwide could be reduced by 42 percent between 1990 and 2020—potentially the single largest reduction in malnutrition, in both absolute and relative terms, in any country in the world.

AFRICA, THE TRUE CHALLENGE

Between now and 2030 the world’s food system will have to respond to more than its share of perils, but most will have nothing to do with China. In much of South Asia, population is dense and still growing rapidly, malnutrition is already severe (there are roughly four times as many underweight preschool children in South Asia as in China), and problems with soil degradation and water pollution are acute. In Africa, a harsh climate,
poor endowments of natural resources, inadequate public investment in farm research and infrastructure, political corruption and instability, and rural poverty and gender inequity all conspire to keep the increase in food production at just two percent a year—below the rate of population growth. As much as 40 percent of the population is malnourished for part of each year.

The dilemmas in South Asia and Africa are not a product of far-fetched speculation about the distant future; they are a real threat today. These are local and regional food problems, sometimes highly specific to income, caste, gender, and ethnic groups. Malnutrition brought on by such conditions can persist and even worsen whether world grain prices are high or low. In large parts of Africa, the absence of all-weather paved roads can leave the vulnerable rural populations physically disconnected from the world market, and hence relatively unaffected by world price levels.

For Malthusians such as Brown, Africa should be the focus of concern, not China. While population growth is moderating in China, it is still surging dangerously in Africa. Between 1990 and 2050 China’s population will rise to 1.6 billion from 1.1 billion, a 45 percent increase, while Africa’s population will swell to perhaps 2.3 billion from 600 million, a 280 percent increase. By 2075 Africa could be more heavily populated than Asia.

Water scarcity is certainly worsening in China, where annual per capita water availability is projected to decrease by 31 percent by 2050. But lack of water is a far more severe problem in the semiarid regions of Africa. In Kenya, annual per capita water availability is projected to fall by 82 percent by the year 2050, to only 109 cubic meters per person, just 6 percent of the projected Chinese level. Africa’s water resources for agriculture are already inadequate. Forty-four percent of the cultivated land in China is irrigated, compared to only four percent in Africa.

While crop yields and total production in China have shown strong gains in recent years—corn production averaged a 5.8 percent annual increase between 1985 and 1993, for example—yields in a number of African countries have actually declined. In the Sahel region of north-central Africa, drought and soil exhaustion drove down yields of sorghum by about 1.5 percent a year during the 1980s. Among 41 African countries, 13 had declines in yields for cereals, and 15 saw declines for root crops and tubers.

While some grain fields in China are being converted to more productive use, such as fruit and vegetable production, industry, transport, or services, in Africa vast areas of cropland and grazing land are being lost through degradation. On the southern edge of the Sahara, some 250,000 square miles of once-productive land, an area the size of Somalia, have become desert over the past 50 years. As yields have failed to increase on existing croplands, Africa’s farmers have been forced to cut down forests or move onto even more fragile lands to expand production. Africa loses roughly 12 million acres of forest every year, primarily as a result of clearance for agriculture.

Africa has little to show for this abuse; the sacrifice of the rural environment has led neither to economic growth nor to the reduction of poverty. Between 1970 and 1990 poverty among rural Kenyans increased to 47 percent from 40
Robert L. Paarlberg

percent; in sub-Saharan Africa as a whole, the number of malnourished increased to 204 million from 96 million. Over the same period in China, poverty among rural Chinese declined to just 11 percent, from 39 percent. While rapidly industrializing China enjoys a $38 billion trade surplus with the United States and is thus more than able to afford larger grain imports, impoverished Africa must try to finance food imports through foreign aid. This will grow ever more difficult in the years ahead. If Africa's current two percent annual growth rate for food production is not accelerated, its food deficit—the projected difference between its food grain production and consumption—could increase more than sevenfold between 1990 and 2020, to 74 million tons of food grains.

For those trying to imagine how all the people of the world will be fed in the 21st century, Malthusian visions have their place. But that place is not China.

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