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Dry, With a Chance of a Grain Shortage

By Lester R. Brown
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While Chinese Premier Wen Jiabao and President Bush discussed Taiwan, currency rates and North Korea last week, a more important and far-reaching development in U.S.-China relations was going on far from the White House.

Under the North China Plain, which produces half of China's wheat and a third of its corn, water tables are falling by 3 to 10 feet per year. Along with rising temperatures and the loss of cropland to non-farm uses, this trend is shrinking the Chinese grain harvest, which has fallen in four of the past five years. To get an idea of the magnitude, the harvest dropped by 66 million tons during that period, an amount that exceeds the total annual grain harvest of Canada, one of the world's leading grain exporters.

Thus far China has covered its growing grain shortfall by drawing down its once-massive stocks. It can do this for perhaps one more year before those stocks are depleted. Then it will have to turn to the world market for major purchases. The odds are that within the next few years the United States will be loading two or three ships per day with grain destined for China. This long line of ships stretching across the Pacific will function like a huge umbilical cord between the two countries.

This isn't only a question of U.S.-China relations, but also one of the relationship between the Earth's 6.3 billion people and its natural resources, especially water. Food production is a water-intensive process. Producing a ton of grain requires a thousand tons of water, which helps explain why 70 percent of all water diverted from rivers or pumped from underground goes for irrigation.

The tripling of world water demand over the past half-century, combined with the advent of diesel and electrically driven pumps, has led to extensive overpumping of aquifers.

As a result, more than half the world's people now live in countries where water tables are falling and wells are going dry. Among these countries are the three that account for half of the world grain harvest: China, India and the United States. In India, water tables are falling in most states, including the Punjab, that nation's breadbasket. In the United States, aquifers are being depleted under the southern Great Plains and throughout the Southwest, including California.

If the world is facing a future of water shortages, then it is also facing a future of food shortages.

To be sure, it is difficult to trace long-term trends in food production, which fluctuates with weather, prices and the spread of farm technology to developing countries. In one of the major economic achievements of the last half-century, China raised its grain output from 90 million tons in 1950 to 392 million tons in 1998. Since then, though, China's production appears to have peaked, dropping by 66 million tons, or 17 percent.

As a result, it seems likely that China will ultimately need to buy 30, 40 or 50 million tons of grain a year, and then it will have to turn to the United States, which accounts for nearly half of the world's grain exports. Imports on this unprecedented scale will create a fascinating geopolitical situation: China, with 1.3 billion consumers and foreign exchange reserves of $384 billion -- enough to buy the entire U.S. grain harvest eight times over -- will suddenly be competing with American consumers for U.S. grain, in all likelihood driving up food prices.

For the first time in their history, the Chinese will be dependent on the outside world for food supplies. And U.S. consumers will realize that, like it or not, they will be sharing their food with Chinese consumers.

Managing the flow of grain to satisfy the needs of both countries simultaneously will not be easy because it could come amid a shift from a world of chronic food surpluses to one of food scarcity. Exporters will be tempted to restrict the flow of grain in order to maintain price stability at home, as the United States did 30 years ago when world grain

stocks were at record lows and wheat and rice prices doubled. But today the United States has a major stake in a stable China because China is a major trading partner whose large economy is the locomotive of Asia.

The pressure on world food markets may alter the relationship between exporting and importing countries, changing the focus of international trade negotiations from greater access to markets for exporting countries such as the United States to assured access to food supplies for China and the 100 or so countries that already import grain.

The prospect of food and water scarcity emerges against a backdrop of concern about global warming. New research by crop ecologists at the International Rice Research Institute in the Philippines and at the U.S. Department of Agriculture indicates that a 1-degree-Celsius rise in temperature (1.8 degrees Fahrenheit) above the optimum during the growing season leads to a 10 percent decline in yields of rice, wheat and corn. With four of the past six years being the warmest on record, grain harvests are suffering. High temperatures lowered harvests last year in India and the United States and scorched crops this year from France to Ukraine.

The new combination of falling water tables and rising temperatures, along with trends such as soil erosion, has led to four consecutive shortfalls in the world grain harvest. This year production fell short of consumption by a record 92 million tons. These shortages have reduced world grain stocks to their lowest levels in 30 years.

If we have a shortfall in 2004 that is even half the size of this year's, food prices will be rising worldwide by this time next year. You won't have to read about it in the commodity pages. It will be evident at the supermarket checkout counter. During the fall of 2003, wheat and rice prices rose 10 percent to 30 percent in world markets, and even more in some parts of China. These rises may only be the warning tremors before the earthquake.

We can, however, take measures to improve world food security. We could recognize that population growth and environmental trends threaten economic progress and

political stability just as terrorism does. Since the overwhelming majority of the nearly 3 billion people expected to be born during this half-century will be in countries where water tables are already falling and wells are running dry, filling the family planning gap and creating a social environment to foster smaller families is urgent.

The situation with water today is new, but similar to that with land a half-century ago. Coming out of World War II, we looked toward the end of the century and saw enormous projected growth in population but little new land to plow. The result was a concentrated international effort to raise land productivity; boosting the world grain yields from just over one ton per hectare in 1950 to nearly three tons today. We now need a similar global full-court press to raise water productivity, by shifting to more water-efficient crops, improving irrigation and recycling urban water supplies.

As it becomes apparent that higher temperatures are shrinking harvests and raising food prices, a powerful new consumer lobby could emerge in support of cutting carbon emissions by moving to a hydrogen-based economy. It is a commentary on the complexity of our time that decisions made in ministries of energy may have a greater effect on future food security than those made in ministries of agriculture.

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