

Grain Harvest Sets Record, But Supplies Still Tight

Brian Halweil

Following several years of declining harvests, the world's farmers reaped a record 2.316 billion tons of grain in 2007.¹ (See Figure 1.) Despite this jump of 95 million tons, or about 4 percent, over the previous year, commodity analysts estimate that voracious global demand will consume all of this increase and prevent governments from replenishing cereal stocks that are at their lowest level in 30 years.²

Figure 1. World Grain Production, 1961–2007

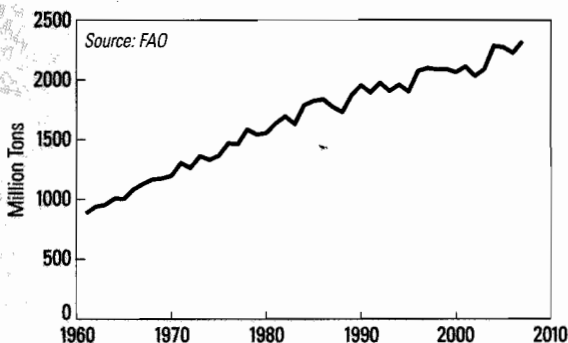
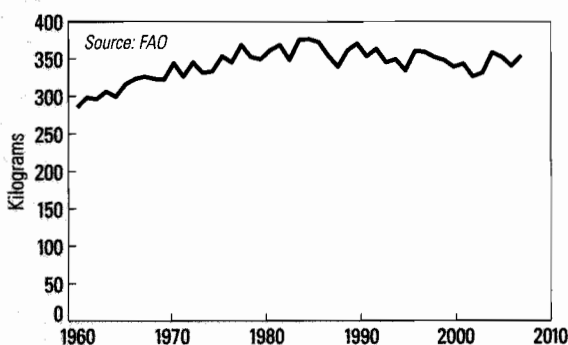


Figure 2. World Grain Production Per Person, 1961–2007



The global grain harvest has nearly tripled since 1961, during a time when world population doubled.³ As a result, the amount of grain produced per person grew from 285 kilograms in 1961 to a peak of 376 kilograms in 1986.⁴ (See Figure 2.) In recent decades, as the growth in grain production has matched population growth, per capita production has hovered around 350 kilograms.⁵

But output per person varies dramatically by region. For instance, it stands at roughly 1,230 kilograms per year in the United States, most of which is fed to livestock, compared with 325 kilograms in China and just 90 kilograms in Zimbabwe.⁶

Economists, hunger activists, and agricultural researchers track world grain production because people still primarily eat foods made from grain. On average, humans get about 48 percent of their calories from grains, a share that has declined just slightly, from 50 percent, over the last four decades.⁷ Grains, particularly corn, in conjunction with soybeans, also form the primary feedstock for industrial livestock production.

People consume a little less than half (48 percent) of the world's grain directly—as steamed rice, bread, tortillas, or millet cakes, for instance.⁸ Roughly one third (35 percent) becomes livestock feed.⁹ And a growing share, 17 percent, is used to make ethanol and other fuels.¹⁰

Although high crop prices have been pushing farmers around the world to plant more land in grains in recent years, a more powerful engine for the record output was a boost in average yields, the amount of grain harvested per hectare. For the last decade, grain yields have surpassed 3 tons—nearly three times the level in 1960.¹¹ Near-perfect weather in major

growing areas as well as an estimated 5 percent jump in world fertilizer use helped farmers increase yields.¹²

World grain production is concentrated in a number of ways—in terms of the species produced, where the crops are raised, and the major exporters. Corn, wheat, and rice account for about 85 percent of the global grain harvest (in terms of weight), with sorghum, millet, barley, oats, and other less common grains rounding out the total.¹³

China, India, and the United States alone account for 46 percent of global grain production; Europe, including the former Soviet states, grows another 21 percent.¹⁴ Argentina, Australia, Canada, the European Union (EU), and the United States account for 80 percent of wheat exports, while just three nations—Argentina, the EU, and the United States—account for 80 percent of corn exports.¹⁵

In 2007, a 200-million-ton jump in the global coarse grain harvest was responsible for nearly all of the increase in the total grain harvest.¹⁶ Production of coarse grains—a group that includes corn, barley, sorghum, and other grains fed mainly to animals—increased 10 percent, from 985 million tons in 2006 to 1,080 million tons in 2007.¹⁷ At 784 million tons, the record harvest of corn was buoyed by the growing use of this grain to produce biofuels, which prompted farmers in the United States (responsible for over 40 percent of the global harvest and half of world exports), Brazil, and Argentina to plant more land to corn.¹⁸ Production in China, the world's second largest corn producer, inched beyond the previous year's record.¹⁹

Worldwide, the amount of coarse grains converted to energy jumped 15 percent to 255 million tons, although this is still small compared with the 627 million tons devoted to another relatively inefficient use—livestock feed.²⁰

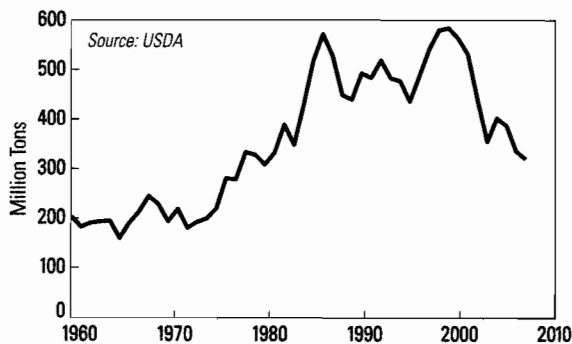
Wheat harvests increased modestly, by 2 percent, to 605 million tons, with near perfect weather nurturing strong harvests in India, the EU, and the United States.²¹ Australia, however, normally the source of one third of world exports, faced lower crop prospects and depleted

exportable supplies.²² And unfavorable weather meant a reduced harvest in China, the world's second largest producer.²³

The global rice harvest was up slightly to 633 million tons, matching the record 2005 harvest, as conditions returned to normal in China, India, and across Asia, which accounts for 90 percent of world production.²⁴

The amount of grain stored by governments—a good measure of the global cushion against poor harvests and rising prices—continues to decline. Global cereal stocks were expected to stand at 318 million tons by the close of the 2007 season, equivalent to about 14 percent of annual consumption.²⁵ (See Figure 3.) These stocks, and the stock-to-use ratio, built up by bumper crops in the 1980s and the late 1990s, are now substantially below their all-time high.²⁶

Figure 3. World Grain Stocks, 1960–2007



Despite the record harvest, the low stocks and strong demand combined to push prices of all cereals to new highs.²⁷ At harvest time, the U.S. corn export price was up about 70 percent from the previous year, while the American hard wheat price averaged 65 percent more than a year earlier.²⁸ Wheat prices in Argentina, another major exporter, doubled since 2006.²⁹ Important wheat exporters like Ukraine and Russia have imposed export restrictions to ensure a sufficient domestic supply.³⁰ Major importers, like Egypt, the European Union,

Yemen, and Iraq, have reacted to high prices by purchasing grain early, which has further tightened supplies and boosted prices.³¹

As such increases ripple through the food chain, people around the world have been greeted with higher prices for bread, beer, corn flour, and other basic foods. Developing countries are likely to spend a record \$52 billion on imports of cereals in 2007, up 10 percent from 2006.³² This follows a 36-percent hike in the previous season.³³

Even international food aid programs, which also purchase their supplies on the world mar-

ket, have been forced to scale back.³⁴ The volume of aid provided through the largest assistance program in the United States, Food for Peace, dropped by nearly half since 2005, to 2.4 million tons, in response to a 35-percent increase in the cost of agricultural commodities as well as the rising costs of fuel for shipping.³⁵ The combination of rising food costs and declining aid can be fatal for the estimated 854 million people worldwide who experience hunger on a regular basis.³⁶

Meat Production Continues to Rise

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In 2007, meat production remained steady at an estimated 275 million tons; in 2008, output is expected to top 280 million tons.¹ (See Figure 1.) Experts predict that by 2050 nearly twice as much meat will be produced as today, for a projected total of more than 465 million tons.² For more than a decade, the strongest increases in production have been in the developing world—in 1995 more meat and dairy products were produced in developing than in industrial countries for the first time, and this trend has continued ever since.³ In fact, in 2007 at least 60 percent of meat was produced in developing nations.⁴

Consumption of meat and other animal products also continues to grow. Currently nearly 42 kilograms of meat is produced per person worldwide, but meat consumption varies greatly by region and socioeconomic status.⁵ In the developing world, people eat about 30 kilograms of meat a year.⁶ But consumers in the industrial world eat more than 80 kilograms per person each year.⁷ (See Figure 2.)

Rising food prices are pushing consumers to choose cheaper cuts of meat, like chicken. (See Figure 3.) Global poultry output in 2007 was expected to reach 93 million tons, a 4-percent increase from the previous year.⁸ The United States is the biggest poultry producer, but other major producers, including Argentina, Brazil, China, the Philippines, and Thailand, are all expecting increases in production. India, however, is likely to have lower poultry production because of the spread of the H5N1 avian flu virus and the culling of millions of chickens.⁹

Pig meat production in 2007 was expected to rise nearly 2 percent, to 101 million tons.¹⁰ It declined the previous year as a result of Porcine Reproductive and Respiratory Disease in China and the massive culling of at least 1 mil-

lion pigs.¹¹ China, however, continues to be the world's largest producer of pig meat, although production is expanding in South America. Argentina, Brazil, and Chile are all increasing pig production, thanks to ample supplies of feed.¹²

Beef output rose by 2.3 percent, with nearly 67 million tons produced in 2007.¹³ The United

Figure 1. World Meat Production, 1961–2007

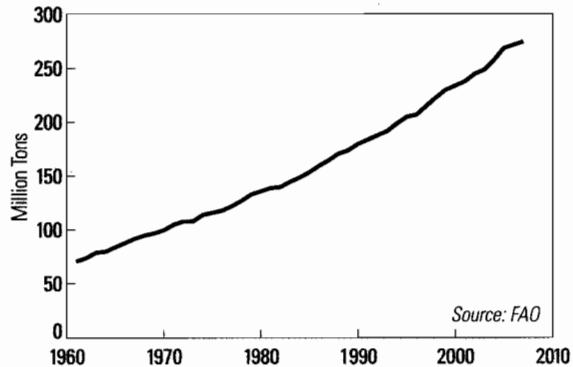
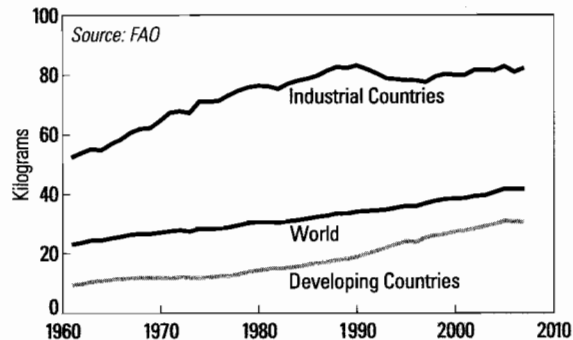


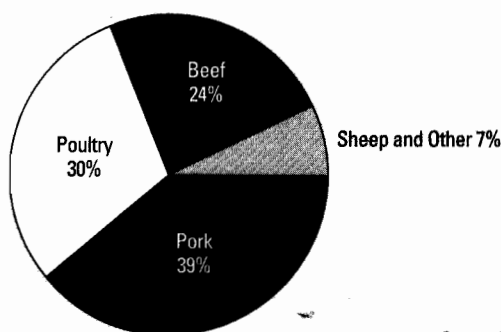
Figure 2. Meat Production Per Person, World, Industrial, and Developing Countries, 1961–2007



States is still the world's largest beef producer, but 56 percent of production now takes place in the developing world.¹⁴ China's beef production is expected to grow by 3 percent in 2008, and despite traditional religious beliefs about the sacredness of cows, India, along with Pakistan, is responding to growing consumer demand for more-western diets by increasing beef production and slaughter.¹⁵

Much of the growing demand for animal

Figure 3. World Meat Production by Source, 2007



Source: FAO

products worldwide is being met by concentrated animal feeding operations, or factory farms.¹⁶ Worldwide, some 56 billion animals are raised and slaughtered for food each year.¹⁷ Factory farms account for 67 percent of poultry meat production, 50 percent of egg production, and 42 percent of pork production.¹⁸ These facilities rely on commercial breeds of livestock, usually pigs and chickens, that have been bred to gain weight quickly on high-protein feeds. Factory farms are also very crowded, confining animals closely together—many of the world's 17 billion hens and meat chickens each live in an area that is less than the size of a sheet of paper.¹⁹ Cattle in feedlots often stand knee-high in manure and arrive at slaughterhouses covered in feces.²⁰

In addition, such operations are increasingly located in or near cities in the developing world, making urban areas the center of industrial meat

production in some countries. And while city dwellers have kept livestock privately for centuries to help dispose of some urban waste, as well as a source of income and food, large industrial operations can create a host of environmental and public health problems. According to the World Bank, the "extraordinary proximate concentration of people and livestock poses probably one of the most serious environmental and public health challenges for the coming decades."²¹ Diseases such as avian flu, pig fever, and Nipah virus can all spread very quickly among animals living in confined animal feeding operations because of the crowded and filthy conditions. BSE, or mad cow disease, was likely the result of feeding cattle the ground-up bits of other ruminants.²² And the use of antibiotics in factory farming is leading to antibiotic resistance.²³ In the United States, livestock now consume 70 percent of all antimicrobial drugs.²⁴

Livestock are also responsible for 18 percent of greenhouse gas (GHG) emissions, as measured in carbon dioxide equivalent, which is higher than the share of GHG emissions from transportation.²⁵ They produce 37 percent of methane, which has more than 20 times the global warming potential of carbon dioxide, and they emit 65 percent of nitrous oxide, another powerful GHG, most of which comes from manure.²⁶

Another environmental problem is water use: livestock operations are major water users and polluters. The irrigation of feed crops for cattle accounts for nearly 8 percent of global human water use.²⁷ The large amount of waste produced on factory farms exceeds the capacity of nearby cropland to absorb it. As a result, manure goes from being a valuable agricultural resource to what is essentially toxic waste. Nitrates, heavy metals, and antibiotics present in manure can seep into groundwater and pollute surface water, threatening public health.²⁸

One way to prevent some of these problems is to discourage large producers from keeping animals in or near cities. A combination of zoning and land use regulations, taxes, incentives, and infrastructure development can encourage

them to raise animals closer to croplands, where manure can be used as fertilizer and where there is less risk of disease transmission to people. Controlling land and livestock nutrient imbalances means raising livestock in areas that have enough land to handle the waste from large operations. Thailand, for example, has levied high taxes on poultry production within a 100-kilometer radius of Bangkok.²⁹ As a result, over the last decade poultry production near Bangkok has dropped significantly.³⁰

Consumers will need to rethink the place of meat and other animal products in their diets to promote better human and environmental health. A recent article, for example, in the *European Journal of Clinical Nutrition* notes

that “vegetarian and vegan diets could play an important role in preserving environmental resources and in reducing hunger and malnutrition in poorer nations.”³¹ And the authors of a September 2007 article in the highly respected medical journal *The Lancet* recommended that people in the industrial world eat 10 percent less meat as a way to reduce greenhouse gas emissions as well as improve human health: “The unprecedented serious challenge posed by climate change necessitates radical responses.... For the world’s higher-income populations, greenhouse-gas emissions from meat-eating warrant the same scrutiny as do those from driving and flying.”³²