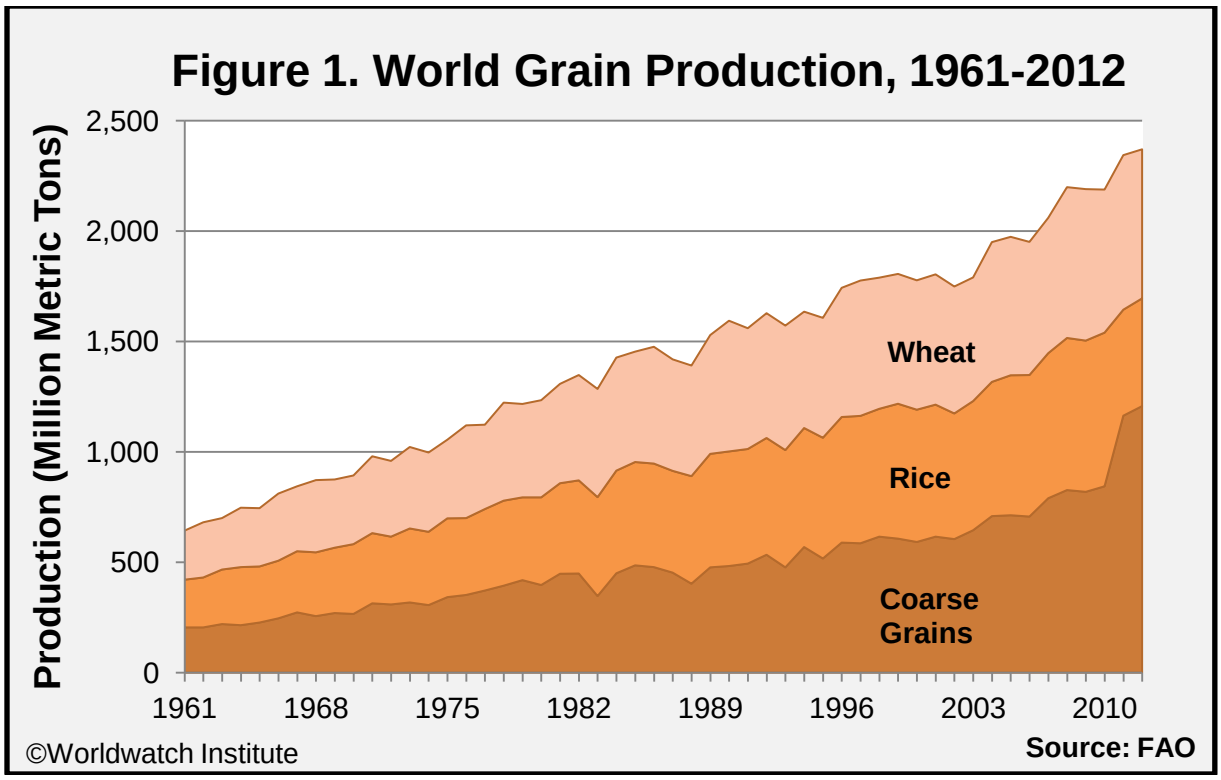
Global Grain Production at Record High Despite Extreme Climatic Events

Danielle Nierenberg and Katie Spoden | September 25, 2012

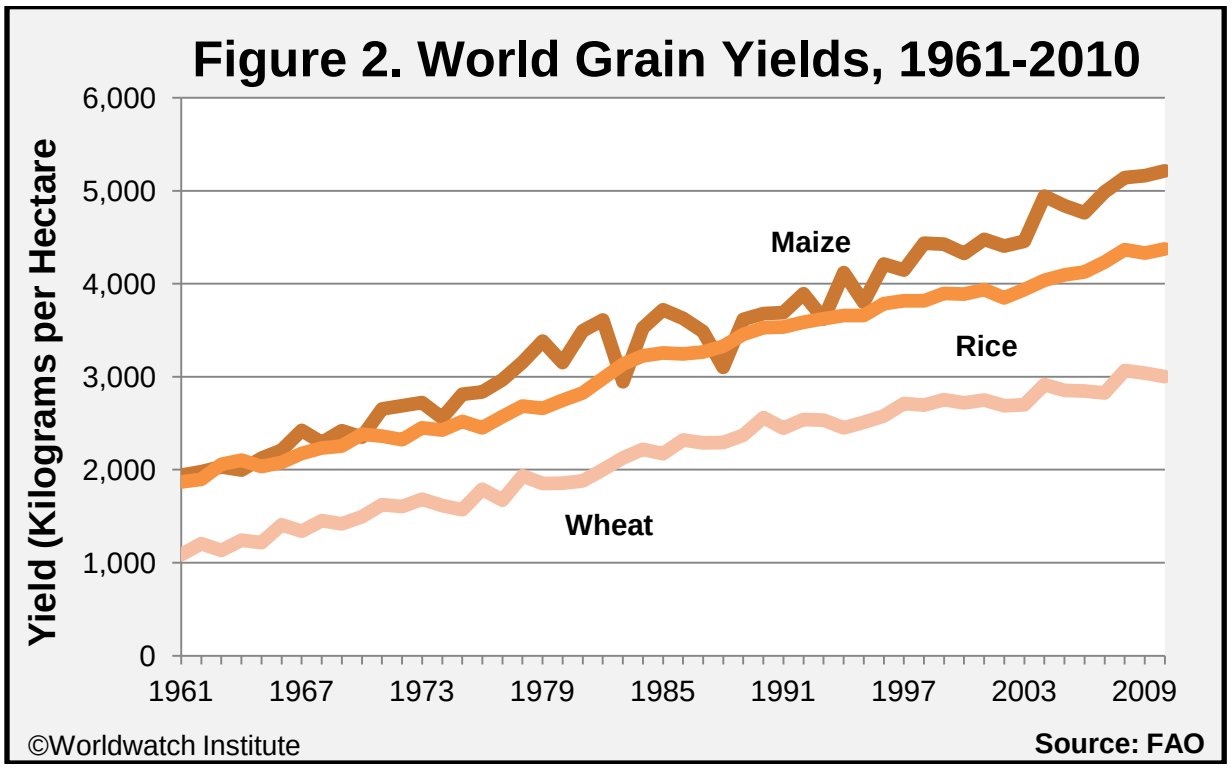
In 2012, global grain production is expected to reach a record high of 2.37 billion tons, an increase of 1 percent from 2011 levels.[1] (See Figure 1.) Grain crops are used for human consumption, animal feed, and biofuels. According to the U.N. Food and Agriculture Organization (FAO), the production of grain for animal feed is growing the fastest—a 2.1 percent increase from 2011.[2] Grain for direct consumption by people grew 1.1 percent from 2011.[3] Grain used for biofuel production and other non-feed uses has slowed to a 1 percent increase from 2011 (compared with an 8.2 percent increase from 2008 to 2009).[4]



In 2011, the amount of grain used for food totaled 570.7 million tons, with India consuming 89 million tons, China 87 million tons, and the United States 28 million tons, according to the International Grains Council.[5] There is a huge global reliance on wheat, maize (corn), and rice for daily sustenance. Of the 50,000 edible plants in the world, these three grains account for two thirds of the world's food energy intake.[6] Grains provide the majority of calories in diets worldwide. Available caloric intake from grain

ranges from 23 percent in the United States to 60 percent in developing Asia and 62 percent in North Africa.[7]

FAO expects global maize production to increase 4.1 percent from 2011, reaching an estimated global production of 916 million tons in 2012.[8] For 2012, rice production is forecast by the FAO at 488 million tons (milled), an increase of 7.9 million tons from 2011.[9] Wheat production is estimated to reach 675.1 million tons in 2012, dropping 3.6 percent from 2011.[10] The decline in wheat production is partially attributed to poor weather during the growing season, including droughts in Morocco and Central Asia and harsh winters in Europe (in Poland, France, Germany, the Czech Republic, Bulgaria, and Hungary).[11]



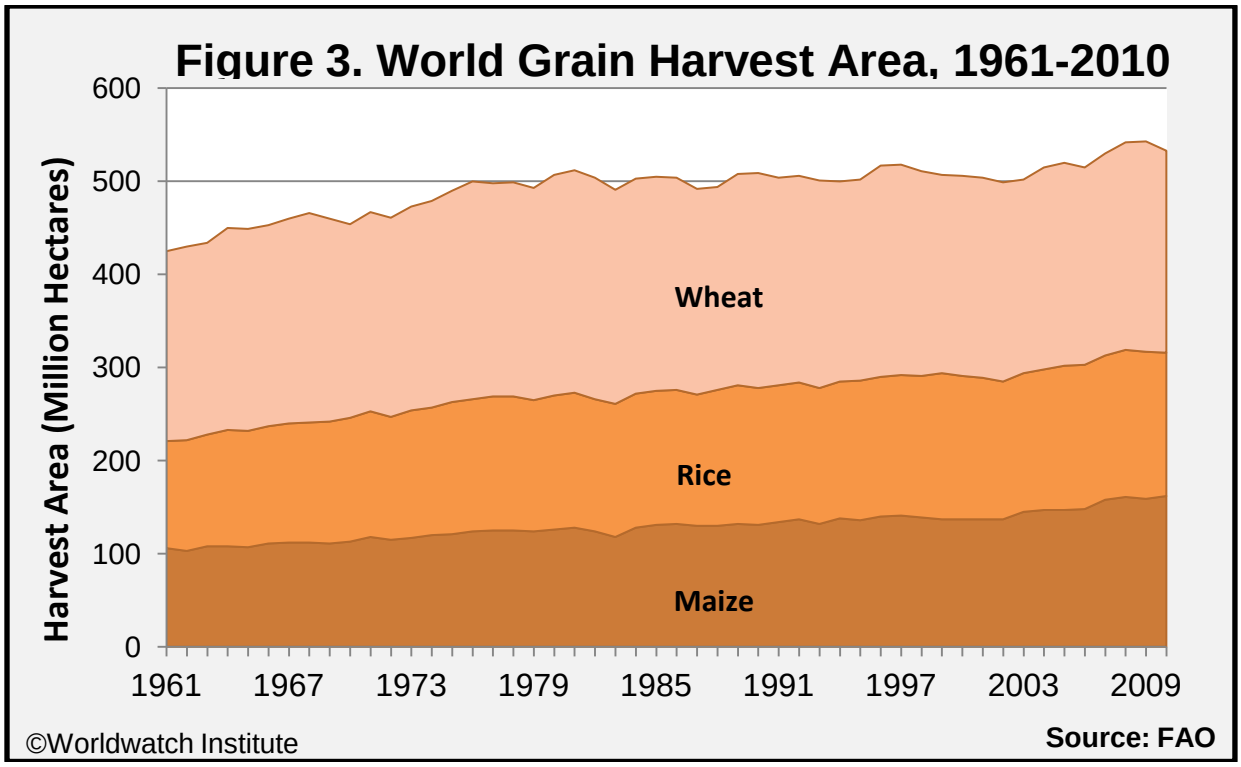
Maize production in the United States—the largest producer—was expected to reach a record 345 million tons in 2012; however, drought in the Great Plains has severely altered this estimate.[12] Maize yields for the 2012–13 growing season are now expected to decrease 13 percent from 2011 production, for a total production of only 274.3 million tons (10.8 billion bushels).[13] Argentina experienced an 11-percent decline in maize production in 2011, producing just 20.3 million tons, also due to extended drought.[14] Brazil, on the other hand, produced a record-high 66 million tons of maize in 2012, a 17-percent increase from the previous record in 2011.[15]

Global rice production achieved an all-time high in 2011, a 2.6 percent increase to 480.1 million tons (milled rice equivalent) from 2010.[16] With the 2012 rice season just beginning and with farmers south of the equator beginning to harvest, production is forecast to increase 1.7 percent to 488 million tons in 2012.[17] In Thailand, Laos, Myanmar, and Western Africa, rice production is expected to recover after floods in 2011.[18] In Argentina, Brazil, Paraguay, and Uruguay, however, rice cultivation dropped due to lower prices, increased costs, and water shortages.[19] Overall, regional rice production in South America may decrease by 7 percent.[20]

World wheat production is projected to decline by 3.6 percent from 2011 to 675.1 million tons, with the largest declines in feed and biofuel utilization.[21] The decline can be largely attributed to extreme climatic events.[22] Wheat production in the United States had been expected to increase due to a prediction of

more-favorable weather than in 2011, but more than 33 percent of U.S. counties are currently in severe drought zones—declared natural disaster areas by the U.S. Department of Agriculture.[23]

Since 1960, grain harvest area has increased slightly while production and yield levels have risen dramatically. Grain production has increased 269 percent since 1961, while yield has increased 157 percent.[24] (See Figure 2.) But grain harvest area has only increased 25 percent.[25] (See Figure 3.) The increase of production and yield from 1960 and the significantly smaller increase in grain harvest area are largely due to the Green Revolution and the introduction of high-yielding grain varieties.



Consumption of rice and maize is projected to increase in 2012. Rice consumption per capita is expected to reach 57 kilograms.[26] In 2013, rice consumption is expected to drastically change due to India's National Food Security Bill.[27] This program will include subsidized rice that will extend to 75 percent of the rural population and 50 percent to the urban population.[28] The increase in global maize consumption is mainly in feed and industrial uses due to projected increases in meat consumption.[29] Global wheat consumption per capita is expected to remain relatively stable.[30] Of the 475.5 million tons of wheat used for consumption, per capita consumption is about 60 kilograms in developing countries and 97.5 kilograms in industrial nations.[31]

The reliance on grain crops for food security is threatened by more-extreme climatic events, especially droughts and floods. According to the United Nations International Strategy for Disaster Risk Reduction, the World Food Programme, and Oxfam International, some 375 million people will be affected by climate change–related disasters by 2015.[32] By 2050, FAO notes, 10–20 percent more people will be subject to hunger based on the changing climate's effects on agriculture and 24 million more children are expected to be malnourished—21 percent more than if there were no climate change.[33]

In response to the detrimental effects of climate change on grain crops, there are initiatives to reduce price volatility, move away from fossil fuel–based agriculture, and recognize the importance of women farmers to increase resilience to climate change. Examples include building up grain reserves, diversifying cropping systems, encouraging agroecology, and supporting women's empowerment in sustainable agriculture.[34] According to the Institute for Trade and Agriculture Policy, "grain reserves are a

relatively cheap public insurance policy in the face of tremendous uncertainty, when the risks of failure include starvation." [35]

The relationship between food security, grain production, and climate change is especially pertinent in 2012. The drought taking place in the Midwest and Great Plains of the United States is considered the worst drought in 50 years, coming close to matching the late 1930s Dust Bowl.[36] The drought is expected to cost many billions of dollars and could top the list as one of the most expensive weather-related disasters in U.S. history.[37] The global market will be most affected by this drought, as so much of the developing world relies on U.S. corn and soybean production.[38] Food prices have already begun to increase due to lower yields, and price fluctuations will inevitably affect food security around the globe, especially in the United States and developing countries.[39]

Farmers are also finding ways to build resilience to climate change, including using cover crops, agroforestry, rainwater harvesting, and other agroecological approaches. Agriculture experts at the Rockefeller Foundation have developed a comprehensive list of necessary actions for climate-resilient development.[40] To ensure the ability of farmers to continue to grow crops despite a changing climate, they suggest increased capacity building of agricultural extensions agents to reach the most vulnerable communities; partnerships among agricultural institutions, nongovernmental groups, governments, climate organizations, and donors to find relevant solutions; and institutional policy reform that supports the world's most vulnerable farmers.

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Notes

[1] U.N. Food and Agriculture Organization (FAO), Food Outlook, May 2012, p. 1. FAO includes coarse grains with maize data. All tons in this article are metric tons.
[2] FAO, op. cit. note 1.
[3] Ibid.
[4] Ibid.; FAO, Food Outlook, June 2008.
[5] International Grains Council, Grain Market Report, 26 July 2012, p. 3.
[6] "Staple Foods: What Do People Eat?" in Tony Loftas, ed., Dimensions of Need, An Atlas of Food and Agriculture (Rome: FAO, 1995).
[7] U.S. Department of Agriculture (USDA), Foreign Agricultural Service, "Diets Around the World: How the Menu Varies," material based on data and analysis of Stacey Rosen, Economic Research Service, USDA, and on the FAO AGROSTAT database, last updated 14 October 2004.
[8] FAO, op. cit. note 1, p. 15.
[9] Ibid., p. 4.
[10] Ibid., p. 2.
[11] Ibid., pp. 10–11.
[12] Ibid., p. 16.

[13] USDA, National Agricultural Statistics Service, Agricultural Statistics Board, Crop Production, 10 August 2012.
[14] FAO, op. cit. note 1, p. 16.
[15] Ibid.
[16] Ibid., p. 22.
[17] Ibid., p. 23.
[18] Ibid.
[19] Ibid.
[20] Ibid.
[21] Ibid., p. 2.
[22] International Grains Council, Grain Market Report, 2 July 2012, p. 2.
[23] FAO, op. cit. note 1, p. 10; Mark Memmott, "Drought Disasters Declared in More Counties: 1,207 Affected So Far," National Public Radio, 18 July 2012.
[24] FAO, FAOSTAT Statistical Database, at faostat.fao.org; FAO, op. cit. note 1; USDA, Foreign Agricultural Service, World Agricultural Production, Circular Series WAP 08–11, August 2011; FAO, Rice Market Monitor, April 2012.
[25] FAO, op. cit. note 24.
[26] FAO, op. cit. note 1, p. 25.
[27] Ibid.
[28] Ibid.
[29] International Grains Council, op. cit. note 22.
[30] FAO, op. cit. note 1, p. 13.
[31] Ibid.
[32] U.N. International Strategy for Disaster Reduction, Climate Change and Disaster Risk Reduction (Geneva: 2008), as cited in U.N. Environment Programme (UNEP) Management Group, "Drylands in a Global Context," Global Drylands: A UN System-wide Response (Nairobi: UNEP, 20 October 11); World Food Programme from FAO Committee on Food Security, *Managing Vulnerability and Risk to Promote Better Food Security and Nutrition*, Policy Roundtable Background Paper (Rome: October 2010); Oxfam International, "54 Percent Increase in Number of People Affected by Climate Disasters by 2015 Could Overwhelm Emergency Responses," press release (Oxford: 21 April 2009).
[33] FAO Committee on Food Security, op. cit. note 32, p. 5.
[34] Sophia Murphy, in Grain Reserves and the Food Price Crisis: Selected Writings from 2008–2012 (Minneapolis, MN: Institute for Agriculture and Trade Policy (IATP), June 2012), p. 3; Jim Harkness, "The 2050 Challenge to Our Global Food System," remarks at National Food Policy Conference, Consumers Federation of America, Washington, DC, October 2011.
[35] Sophia Murphy, Grain Reserves: A Smart Climate Adaptation Policy (Minneapolis, MN: IATP, November 2010).
[36] Alyssa A. Botelho and Joel Achenbach, "Drought Intensifies in Most-parched Areas of U.S.," Washington Post, 3 August 2012.
[37] Mark Memmott, "Drought in U.S. Now Worst Since 1956; Food Prices to Spike, Economy to Suffer," National Public Radio, 17 July 2012.
[38] Eric Holt-Giménez, interview with Ian Masters, "Geopolitics of Drought," GRAIN, 19 July 2012.
[39] Anne Lowrey and Ron Nixon, "Food Prices to Rise in Wake of Severe Drought," New York Times, 25 July 2012.
[40] Rockefeller Foundation, "African Agriculture & Climate Change Resilience," at www.rockefellerfoundation.org/what-we-do/current-work/developing-climate-change-resilience/african-agriculture-climate-change.