



Agricultural Resources and Environmental Indicators, 2019

Daniel Hellerstein, Dennis Vilorio, and Marc Ribaudó (editors)

What Is the Issue?

Agricultural production affects a wide range of natural resources, including land, water, and air. This report provides concise information about how natural resources (land and water) and commercial inputs (energy, nutrients, pesticides, antibiotics, and other technologies) are used in the agricultural sector and how they contribute to environmental quality. To assist public and private decision making around how best to manage these resources and their impacts, the report further explores the complex links among public policies, economic conditions, farming and conservation practices, productivity and technological change, resource use, and the environment. The objective is to provide a comprehensive source of data and analysis on the factors that affect resource use and quality in American agriculture.

What Did the Study Find?

Notable findings for Farms and Farm Productivity include:

- As of 2017, small farms (family farms with less than \$350,000 in revenue) made up 89 percent of U.S. farms. But the 3 percent of farms with at least \$1,000,000 in revenue accounted for 39 percent of production.
- In 2012, almost 53 percent of the 2.3 billion acres of land in the United States was used for agricultural purposes, including cropping, grazing (in pasture, range, and forests), farmsteads, and farm roads.
- Between the early 2000s and 2015, average U.S. farm real estate value nearly doubled in inflation-adjusted terms. Since 2015, the value of cropland has declined by nearly 5 percent.
- In 2014, 61 percent of land in farms was owner-operated, with the remaining land rented out by the landowner to a tenant farm operator. Non-operator landlords own 80 percent of all rented farmland.
- From 1948 to 2015, agricultural output grew 1.48 percent per year while aggregate input use increased only 0.1 percent annually on average.
- Since the early 2000s, private-sector food and agricultural research and development (R&D) has grown much more rapidly than public-sector R&D, so by 2014 the private sector spent nearly three times as much as the public sector.
- Corn, cotton, and soybean growers have widely adopted genetically engineered (GE) herbicide-tolerant (HT) and insect-resistant (Bt) seeds since 1996. By 2018, 90 percent of corn, cotton, and soybean acres planted in the United States used HT seeds, and 80 percent of corn and cotton acres used seeds also containing Bt traits.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

- Herbicide application rates per planted acre in 2014 compared to 2010 were up 21 percent for corn, 25 percent for cotton, 26 percent for wheat, and 24 percent for soybeans. The types of herbicides used have changed over time.
- Commercial fertilizer consumption was about 22 million short tons in 2015. For corn, winter wheat, and cotton, nitrogen recovery rates hovered around 70 percent, while phosphate recovery rates were at 60 percent.
- In 2012, irrigated farms represented about 14 percent of all U.S. farms but accounted for 39 percent of U.S. farm sales. Between 1984 and 2013, acreage in water-efficient sprinkler and drip/trickle systems rose from 37 to 76 percent of irrigated area in the Western United States.
- Precision agriculture comprises technologies such as guidance systems and variable-rate technology (VRT). By 2013, over 20 percent of planted corn, soybeans, and rice acreage were farmed using VRT.
- By the end of 2017, 44 percent of U.S. broiler chickens were raised without any antibiotics. Between 2004 and 2015, the share of finishing hogs from operations reporting that they *did not know* or *did not report* whether antibiotics were used for growth promotion rose from 7 percent to 35 percent.
- Conservation tillage, which can reduce soil erosion and sediment loss, is used on around 70 percent of soybean acres, 40 percent of cotton, 65 percent of corn, and 67 percent of wheat.
- U.S. organic retail sales reached an estimated \$49 billion in 2017. The number of certified organic operations in the United States more than doubled between 2006 and 2016.
- Animal manure provides a source of nutrients for crops. In 2011, around 66 percent of broiler operations had a nutrient management plan, compared to 54 percent of hog operations and 41 percent of dairies.
- As of 2017, across the Nation, 55 percent of assessed rivers and streams; 71 percent of lakes; and 84 percent of bays and estuaries nationally have impaired water quality. Agriculture is the largest source of impairments in rivers and streams and the second-largest source in lakes and ponds.
- Drought is the leading cause of production risk and crop insurance indemnity payments in the United States. Practices such as irrigation adoption can reduce drought vulnerability.
- Many farmers and ranchers use practices that enhance soil health. In 2012, 35 percent of all cropland acres were in no-till and 3 percent were planted with a cover crop, two practices that promote soil health.
- Based on a land use-based measure of quality, pollinator forage habitat increased between 1982 and 2002, then declined until 2012. The decline was greatest in the Northern Plains, a summering ground for commercial beehives.
- Between 2007 and 2012, the number of farms producing energy or electricity onfarm with solar panels, geothermal exchange, wind turbines, small hydro, or methane digesters increased from 1.1 to 2.7 percent.
- Federal funding for the five largest voluntary programs that encourage land retirement and adoption of conservation practices on working lands was roughly \$6 billion in 2017. In real (inflation-adjusted) terms, conservation spending increased in the 2002 and 2008 Farm Acts and declined in the 2014 Farm Act.
- Since 1992, freshwater wetlands in the contiguous United States have held steady at around 111 million acres.
- Between 2012 and 2018, acreage enrolled in USDA's Conservation Reserve Program (CRP) declined from 29.5 million to 22.4 million acres. However, land enrolled in the continuous portion of the CRP increased from 5.3 million to 8.1 million acres.
- In 2016, an estimated 1.7 percent of farms were enrolled in the USDA's Environmental Quality Incentives Program (EQIP), and 5.1 percent were enrolled in the Conservation Stewardship Program (CSP).

How Was the Study Conducted?

Each chapter reflects the most recent data and information available on that topic as of July 2018. As described in the data appendix, the report relies heavily, but not exclusively, on the Agricultural Resource Management Survey (ARMS), the Census of Agriculture, and USDA Administrative data. This report was prepared before the release of the 2017 Census of Agriculture. Instead, the report uses the 2012 Census of Agriculture.