

World Agricultural Production, Resource Use, and Productivity, 1961–2020

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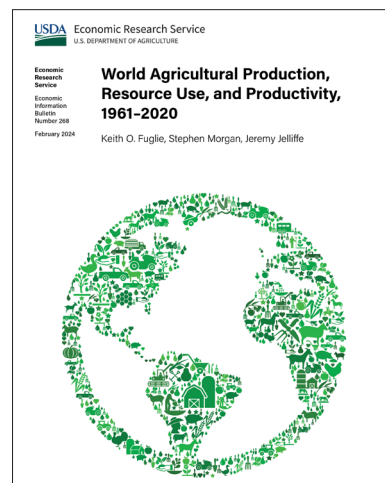
What Is the Issue?

World agriculture has undergone significant transformation over the past six decades. Over this period, most regions of the world transitioned from a natural resource-dependent to a productivity-led growth path, made possible by the development and adoption of new technologies and farming practices. This USDA, Economic Research (ERS) report documents those changes, providing insights into shifting patterns of agricultural production and resource use worldwide. It also shows the evolution of agricultural growth over time and discusses the implications of these dynamics for sustainable use of natural resources and global food security.

What Did the Study Find?

This report shows trends in world agricultural production, resource use, and productivity over the past 60 years (1961–2020). Over this period:

- World production of crop, livestock, and aquaculture commodities grew fourfold, from a gross value of \$1.1 trillion to \$4.3 trillion dollars (at constant 2015 commodity prices).
- The global share of agricultural production in the Global South increased from 44 percent in 1961 to 73 percent in 2020.
- The composition of global agricultural output gradually adjusted to meet changes in demand, with modestly increasing output shares for oil crops, nonruminant livestock, vegetables, fruits, nuts, and aquaculture and declining output shares for root and tuber crops, cereal grains, and beef cattle.
- Land in global agriculture increased by 8 percent, from 4.43 billion hectares to 4.76 billion hectares. Agricultural land in the Global North declined by 260 million hectares, whereas it increased by 597 million hectares in the Global South, for a net gain of 336 million hectares.
- Irrigated area grew by a factor of 2.3 times between 1961 and 2020 to 343 million hectares; water use in agriculture now accounts for about 70 percent of total global freshwater withdrawals.



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.

- Labor employed on farms worldwide peaked at 1.06 billion people in 2003 but subsequently declined to 841 million people by 2020, working on approximately 600 million farms.
- The use of synthetic fertilizers, especially nitrogen, expanded rapidly during the 1960s through the 1980s; since the 1990s, it has increased at about the same rate as agricultural output.
- The use of feed concentrates, especially protein dense oil crops and meals, became an increasingly important source of animal nutrition and the major feedstuff for nonruminant livestock, poultry, and farm raised fish.
- Agricultural total factor productivity (TFP) measures total output of a sector relative to the total inputs of land, labor, capital, and materials. The world agricultural TFP growth rate increased over the decades from 1961 to 2010, rising from less than 0.1 percent per year in 1961–70 to nearly 2.0 percent per year on average by 2001–10. Agricultural TFP growth then slowed to an average of 1.1 percent per year over 2011–20.
- Increases in agricultural TFP reduced the intensity of natural resource use in agriculture; between 1990 and 2020, the global average amount of land used and greenhouse gasses emitted per unit of agricultural output fell by half or more.
- Sub-Saharan Africa has lagged behind the rest of the world in agricultural productivity; underinvestment in agricultural research and development, limited access by farmers to new technologies and markets, and weak agricultural extension systems are a few of the major constraints to improving farm productivity in this region.

How Was the Study Conducted?

The study drew heavily on USDA, ERS's International Agricultural Productivity data product, which documents the outputs and inputs used in world agriculture and constructs country and regional indices of agricultural total factor productivity (TFP) over the 1961–2020 period. Selected information from other sources help illustrate and explain major developments in world agricultural production and resource use and the linkages between agricultural productivity growth, use of natural and environmental resources, and global food security. Supplementary materials to the report describe the sources of data and the methodology for constructing the TFP indices and estimates of global capacities in public agricultural extension.