



Synopsis of the webinar
Sustainable Agricultural Productivity Growth: COP27 and Beyond
November 2, 2022

This webinar, hosted by the Coalition on Sustainable Productivity Growth for Food Security and Resource Conservation focused on the critical role that agricultural productivity growth plays in reducing GHG emissions from agriculture and providing food for all now and into the future. The webinar featured four speakers, each of whom presented new evidence underscoring the importance of agricultural productivity growth for climate-change mitigation and adaptation.

The first speaker, Dr. Keith Fuglie, Senior Economist, Economic Research Service, U.S. Department of Agriculture, presented on *Agricultural Productivity Growth, Food Security, and GHG Emissions*. Major points from Dr. Fuglie's presentation include:

- Accelerating growth in agricultural productivity improves global food security and reduces GHG emissions from agriculture.
- Agricultural productivity growth, as measured by total factor productivity (TFP), measures the increase in efficiency with which inputs are combined to create agricultural outputs. It is the result of innovative new technologies and improved production and management approaches.
- Data show that agricultural productivity growth helps to improve food security and lessen input use in agriculture, including land use.
- Data from 1960 through 2020, show that faster TFP growth contributed to fewer GHG emissions, due to reductions in input use, including reductions in agricultural land expansion.
- Countries where agricultural productivity growth has reduced inputs have been able to curb the growth of, or even reduce, greenhouse gas emissions from agriculture. Countries where input use is still rising are seeing rapid growth in emissions.
- In the last decade, global agricultural output growth has slowed, due largely to a decline in agricultural productivity growth. Growth in the expansion of agricultural land-use increased over the same time period.
- More information, see Fuglie et. al (2021), [Slowing Productivity Growth Reduces Growth in Global Agricultural Output](#), Amber Waves, ERS-USDA.

The second speaker, Nelson Villoria, Associate Professor, Kansas State University, presented on the *Consequences of Agricultural Total Factor Productivity Growth for the Sustainability of Global Farming: Accounting for Direct and Indirect Land Use Effects*. Main points from Professor Villoria's presentation:

- TFP growth during 2001-2010 restrained cropland expansion in the most biodiverse regions of the world while avoiding significant greenhouse gas emissions.
- An econometric model of cross-country cropland changes and TFP growth using data from 70 countries between 2001-2010 reveals that even though domestic TFP growth may have triggered cropland expansion in some countries, TFP growth along with world agricultural trade led to a reduction in global cropland expansion.
- In the absence of TFP growth, results suggest that ~125Mha would have been needed to satisfy demand, half of which would have been in the four most biodiverse biomes of the world, with

estimated land use emissions from the ensuing changes in land use ranging from a lower bound of 17 GtCO₂eq to an upper bound of 84 Gt CO₂eq.

- Current rates of TFP growth are insufficient to prevent further land expansion, reversing in most cases the in-sample trends in land contraction observed during 2001–2010.
- For more information, see Villoria (2019) Consequences of Agricultural Total Factor Productivity Growth for the Sustainability of Global Farming: Accounting for Direct and Indirect Land Use Effects, *Environmental Research Letters*, 14 125002, <https://doi.org/10.1088/1748-9326/ab4f57>

The third speaker, Stephan Hubertus Gay, Senior Agricultural Policy Analyst, Trade and Agriculture Directorate, Organization for Economic Co-operation and Development, presented on *Agricultural Productivity Growth, Hunger, and the Paris Climate Goals*. Main points from Dr. Gay's presentation include:

- The 2022 OECD-FAO outlook projections find that to achieve the 2030 Zero Hunger target while simultaneously keeping agricultural emissions on track to reach the Paris Agreement targets, average global agricultural productivity would need to increase by 28% over the next decade. This is more than triple the increase recorded in the last decade.
- For crops, the necessary 24% increase in average global yields – which acts as a proxy for crop productivity – is close to double the increase achieved over the past decade (13%).
- Global animal productivity would have to increase by 31%, on average, vastly exceeding the growth recorded during the last decade.
- Comprehensive action to boost agricultural investment and innovation and to enable the transfer of knowledge, technology, and skills are urgently required in order to put the agricultural sector on the necessary trajectory for sustainable productivity growth and the transformation towards sustainable food systems.
- Additional efforts to reduce food loss and waste and limit excess calorie and protein intakes, particularly from animal sources, would also be necessary
- For more information, see the [OECD-FAO Agricultural Outlook 2022-2031](#)

The fourth speaker, Racine Ly, Director, Data Management, Digital Products and Technology, AKADEMIYA2063, presented on *The Africa Agriculture Watch (AAgWa) Platform, Agricultural Productivity Growth and Food Security*, Main points from Dr. Ly's presentation include:

- Data on agricultural land-use change can support strategic agricultural productivity growth and climate-change mitigation and adaptation.
- The provision of multi-annual and granular geographical data allows tracking of changes in crop-production patterns, cropland extension, and forest cover. These data support efforts to identify drivers of change and target interventions for sustainable productivity growth.
- Africa Agriculture Watch (AAgWa) is an open access online platform that provides food crop production and yield forecasts before harvesting periods.
- AAgWa uses remote sensing satellite images and machine learning techniques to generate information at the community level.
- The platform has been providing annual data and analytics for 47 African countries and 8 crops since 2020.
- For more information, see <https://www.aagwa.org/about>

To find out more about the SPG Coalition, including terms of reference and how to join, please visit our website <https://www.usda.gov/oce/sustainability/spg-coalition>