Strengthening the climate for sustainable agricultural growth

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Today, the 2021 Global Agricultural Productivity Report (GAP Report), "Strengthening the Climate for Sustainable Agricultural Growth," was released by Virginia Tech's College of Agriculture and Life Sciences. It

urges the acceleration of productivity growth from smallholders to large-scale farmers to meet consumers' needs and address current and future threats to human and environmental well-being.

Every October, the GAP Report is released as part of the Borlaug Dialogue and World Food Prize events in Des Moines, Iowa. A recording of the 2021 report launch is available on the GAP Report website.

The theme of the 2021 GAP Report encompasses the changing climate on agricultural productivity and strengthening the policy and investment landscape to invigorate productivity growth and adaptation to climate change.

Productivity growth remains the primary source of agricultural output growth globally, but new data reveals that it is not growing as fast as previously thought.

USDA Economic Research Service data presented in the report indicate that globally, total factor productivity, or TFP, grew by an average of 1.36 percent annually. The Global Agricultural Productivity Index sets an annual target of 1.73 percent growth to ensure sustainable productivity growth.

"The GAP Report has a renewed urgency this year," said Tom Thompson, associate dean and director of CALS Global in the College of Agriculture and Life Sciences, and executive editor of the GAP Report. "With lower than expected TFP numbers and the significant impact of climate change on agricultural productivity, it is time for action."

Middle-income countries, including India, China, Brazil, and the countries of the former Soviet Union, continue to have the most robust

TFP growth rates that are above the GAP Index target.

However, nearly all agricultural output growth in low-income countries comes from land-use change and forest and grassland destruction for cultivation and grazing. As a result, these countries have a negative TFP growth rate of -0.31 percent annually, decreasing from 0.58 percent in 2020.

High-income countries, including those in North America and Europe, are showing modest TFP growth. In the U.S. and Canada, the increase in productivity generates more output of crop, livestock, and aquaculture products. The European Union, by contrast, shows minimal output growth, using their increased efficiency to remove land and inputs from agricultural production.

According to the report, human-caused climate change has slowed global agricultural productivity growth by 21 percent since 1961. In the drier regions of Africa and Latin America, climate change has slowed productivity growth by as much as 34 percent.

For many of the world's producers, adapting to climate change and protecting their livelihoods are the most immediate challenges. Small and large farms alike can be equally efficient. With access to productivity-enhancing inputs, agronomic knowledge, and markets, producers of any scale can optimize their productive potential.

The 2021 GAP Report has identified six strategies and policies that would create sustainable agricultural growth at all scales of production:

- Invest in research and development and extension, as every dollar invested in public research and development is returned ten-fold as increased food security, sustainability, and economic growth.
- Science-based technologies give producers tools to prepare for

and recover from pest and disease outbreaks, extreme weather events, and market fluctuations.
- Efficient physical infrastructure, information, and finance infrastructures provide producers affordable and equitable access to markets and facilitate economic growth.
- Public-private partnerships transfer environmentally and socially relevant technology and knowledge to producers.
- Improving systems and services for fruit and vegetable trade would generate income for producers and increase consumers' access to nutritious foods.
- Reductions in post-harvest loss and food waste can increase food availability, lower food prices, and support healthy ecosystems.

"These policy and investment priorities help producers of all scales sustainably maximize their productive potential," said Ann Steensland, leader of the GAP Initiative and author of the GAP Report. "To increase productivity in the face of climate change is a tall order for most of the world's farmers, so the time to act is now."

The GAP Report will be available in printed form, as well as on the website. The website features a new interactive world map with country-level TFP data from 173 countries.

The report includes an essay by Wei Zhang, the GAP Initiative faculty research fellow and an assistant professor of agricultural economics at Virginia Tech, describing her research on the impact of extreme weather events on productivity growth. Results will be published in the 2022 GAP Report.

The GAP Report partners contribute stories to the report on a wide variety of topics, including carbon sequestration incentives for farmers, sustainable farming practices in Zambia, small-scale mechanization financing, regenerative practices in livestock feed production, and best

practices in nutrient management.

Rattan Lal, 2020 World Food Prize Laureate from The Ohio State University, contributed an essay, "Soil Health and Global Agricultural Productivity," that will appear in the report and online.

The 2021 GAP Report, charts, infographics, and animation are available for download at the GAP Report website.

Provided by Virginia Tech