Vertical farming for the future

Indoor and vertical farming may be part of the solution to rising demands for food and limited natural resources.
Photo by Oasis Biotech

Imagine walking into your local grocery story on a frigid January day to pick up freshly harvested lettuce, fragrant basil, juicy sweet strawberries, and ripe red tomatoes – all of which were harvested at a local farm only hours before you'd arrived. You might be imagining buying that fresh produce from vertical farms where farmers can grow indoors year-round by controlling light, temperature, water, and oftentimes carbon dioxide levels as well. Generally, fresh produce grown in vertical farms travels only a few miles to reach grocery store shelves compared to conventional produce, which can travel thousands of miles by truck or plane.

Beyond providing fresh local produce, vertical agriculture could help increase food production and expand agricultural operations as the world's population is projected to exceed 9 billion by 2050. And by that same year, two out of every three people are expected to live in urban areas. Producing fresh greens and vegetables close to these growing urban populations could help meet growing global food demands in an environmentally responsible and sustainable way by reducing distribution chains to offer lower emissions, providing higher-nutrient produce, and drastically reducing water usage and runoff.

Recently, USDA and the Department of Energy held a stakeholder workshop focused on vertical agriculture and sustainable urban ecosystems. At this workshop, field experts shared thought-provoking presentations followed by small group discussions focusing on areas such as plant breeding, pest management, and engineering. Workshop attendees from public and private sectors worked together to identify the challenges, needs, and opportunities for vertical farming. A report on this workshop will be released to help inform Departmental strategic planning efforts for internal research priorities at USDA and external funding opportunities for stakeholders and researchers.

We're excited about the potential opportunities vertical agriculture presents to address food security. That's why USDA already has some of these funding and research opportunities in place. The National Institute for Food and Agriculture has funding opportunities (PDF, 1.22 MB) that could support future vertical agriculture conferences and research. Similarly, the Agricultural Research Service is working on a project to increase U.S. tomato production and quality in greenhouses and other protected-environments. We look forward to continuing our partnership with our customers, both internal and external.

Authored by by Sarah Federman, AAAS Science and Technology Policy Fellow, Office of the Chief Scientist and Paul M. Zankowski, Senior Advisor for Plant Health and Production and Plant Products, Office of the Chief Scientist

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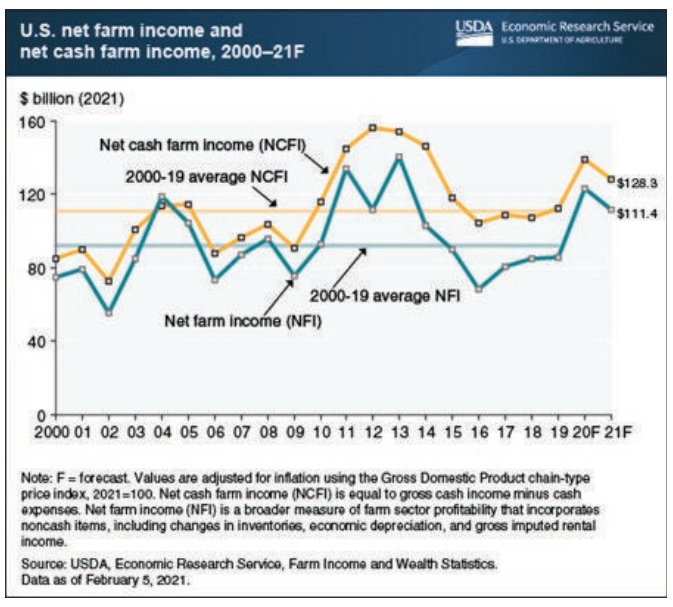
U.S. farm sector profits forecast to fall in 2021



USDA's Economic Research Service (ERS) forecasts inflation-adjusted U.S. net cash farm income (NCFI, gross cash income minus cash expenses) to increase $26.6 billion (23.7 percent) in 2020, and then decrease $10.4 billion (7.5 percent) to $128.3 billion in 2021. U.S. net farm income (NFI) is forecast to increase $37.8 billion (44.2 percent) in 2020 and then decrease $12.0 billion (9.7 percent) to $111.4 billion in 2021. Net farm income is a broader measure of farm sector profitability that incorporates noncash items, including changes in inventories, economic depreciation, and gross imputed rental income. If realized, this would be the first year NFI has fallen since 2016. However, both NCFI and NFI would remain above their respective 2019 levels as well as above their respective averages over the 2000-19 period. Underlying these forecasts, cash receipts for farm commodities are projected to rise $13.6 billion (3.6 percent) in 2021. Direct Government payments to farmers are expected to fall $21.8 billion (46.3 percent) after increasing $24 billion (104.0 percent) in 2020. This decline is largely caused by lower anticipated payments from supplemental and ad hoc disaster assistance for COVID-19 relief. Find additional information and analysis on the ERS topic page for Farm Sector Income and Finances, reflecting data released on February 5, 2021.

COVID-19 . . .

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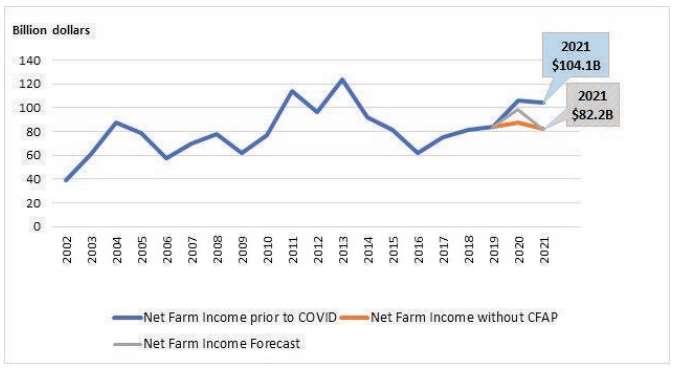
the University of Missouri expects farm income to fall by $21.9 billion in 2021 compared to their forecast prior to COVID-19, even when accounting for higher payments from farm bill programs.

Chart 4: Net Farm Income: FAPRI Estimates with COVID Impacts and CFAP, assuming no CFAP payments in 2021



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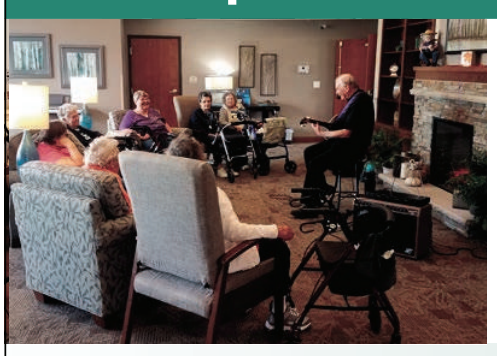
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