



Agricultural Systems

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Drones, virtual fencing, gene technology moving agriculture forward

Land-grant universities and state research agencies are using multiple technologies to solve production challenges and provide educational outreach. From using drones to assess damage following natural disasters to GPS tracking to monitor livestock within the boundaries of virtual fencing, advances in technology are helping propel food and fiber production.

Successful examples include:

- Following Hurricane Idalia, a Category 3 hurricane, Extension educators in **Georgia** used drones to assess crop damage. Drone photos were especially effective for viewing blown over trees and debris piles in large pecan orchards. Photos helped estimate the percentage of yield loss to secure aid for other agencies' disaster programs, document damage for insurance claims and assist growers in seeing crops they were physically unable to access at the time. *University of Georgia; Smith-Lever (3b&c), county funding (See [full statement](#)).*
- In **New Mexico**, Extension is exploring virtual fencing technology to contain livestock, implement grazing management distribution and help recovery of rangelands impacted by wildfire. *New Mexico State University; Other USDA Capacity-Research, Smith-Lever (3b&c) (See [full statement](#)).*
- **Pennsylvania** researchers have used CRISPR, a powerful gene-editing technology, to develop a diagnostic test for early detection of citrus greening. This disease causes green, misshapen and bitter citrus fruit, making them unmarketable and threatening the \$3.35 billion U.S. citrus industry. *Pennsylvania State University; Other USDA Competitive, Hatch (See [full statement](#)).*

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Automating fruit tree pruning using sensor technology

*The apple industry is facing stiff challenges with increasing labor costs and limited labor. Pruning requires 30 to 50 working hours of skilled manual labor and accounts for 20% of total preharvest production costs. At **Pennsylvania** State University, sensor technology attached to manual pruners is helping automate tree-fruit pruning systems, providing cost-effective solutions for apple growers. A robotic, fully automated pruning system would help offset costs and open other avenues for advancements throughout the tree fruit industry. Pennsylvania State University; USDA Competitive, Hatch Multistate (See [full statement](#)).*