IMPROVING PRECISION AGRICULTURE TECHNOLOGY

Worldwide demand for food, fiber, and fuel is increasing rapidly. To keep up, production systems need to be intensified, but also sustainable. Precision technologies, such as GPS, sensors, robotics, drones, autonomous vehicles, and 3D and thermal imaging, help famers fine-tune irrigation, fertilization, disease and pest control, harvesting, and other practices. Precision boosts productivity and limits the impacts of agriculture on our soil, water, and air resources. Research is needed to design and calibrate precision technologies, and farmers need to know how to use these technologies and interpret the complex data they generate.

Researchers and Extension Specialists across the U.S. are working together to advance the science of precision agriculture and support growers who are adopting precision technologies. Increased adoption of advanced precision technologies will help ensure the security of the food, fiber, and fuel we rely on.

RESEARCHERS HAVE DEVELOPED FARMING TOOLS THAT ARE LESS LABOR-INTENSIVE, MORE RELIABLE, COST-EFFECTIVE, AND MAKE CROP PRODUCTION MORE PRECISE, SUSTAINABLE, AND ENVIRONMENTALLY FRIENDLY.

University of California is advancing thermal imaging and drones for monitoring crops. Other researchers developed a platform-mounted mobile imaging and sensing system to help growers capture data on crop canopies so they can make better management decisions.

Colorado State University is advancing nitrogen and water sensing methods and technology. University of Arizona developed a GPS-based sensor system to apply nematicides and an automated sprayer for herbicides. These advances help growers use chemicals and water efficiently, cut costs, and enhance yields.

University of Georgia and University of Florida developed a free smartphone app (*smartirrigationapps.org*) to help farmers operate high-tech irrigation systems that use GPS, soil sensors, and software to control where, when, and how much water is sprayed on crops.

Washington State University designed 3D imaging that detects 35% more apples than other methods. Researchers also used 3D imaging to mechanize pruning, which can be labor intensive and costly.

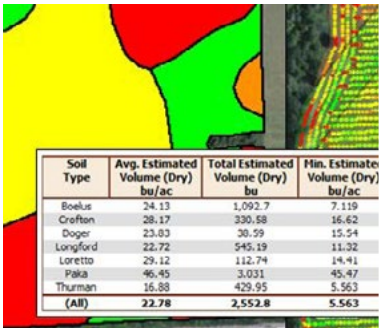
On peanut fields in Georgia and Alabama, GPS auto-guidance during harvest resulted in significantly higher yields and gross revenues than manual guidance.

University of Arizona is developing sensors that quickly assess hail damage to cotton plants. Better estimates of damage will help growers predict crop recovery and aid crop insurance calculations.

A new University of Florida tool detects citrus greening disease with 95% accuracy. Texas A&M University developed technology to better detect cotton root rot. Early detection helps growers tackle diseases before they become widespread and costly.

UNIVERSITY EXTENSION SPECIALISTS HAVE FOUND EFFECTIVE WAYS TO MEET INCREASING DEMAND FOR INFORMATION AND TRAINING ON PRECISION AGRICULTURE TECHNOLOGIES AND THEIR USES.

Farm tours, workshops, and online materials have helped growers, crop consultants, pest control advisors, and others learn more about available technologies that mechanize and automate crop production.



Soil Type	Avg. Estimated Volume (Dry) bu/ac	Total Estimated Volume (Dry) bu	Min. Estimate Volume (Dry) bu/ac
Boelus	24.13	1,092.7	7.119
Crofton	28.17	330.58	16.62
Doger	23.03	30.59	15.54
Longford	22.72	545.19	11.32
Loretto	29.12	112.74	14.41
Paka	46.45	3.031	45.47
Thurman	16.88	429.95	5.563
(All)	22.78	2,552.8	5.563

University of Missouri developed a new method and tool for interpreting large datasets. The University of Illinois is helping process massive databases with state-of-the-art high performance computing systems.

Intensive hands-on trainings are helping participants improve their ability to manage and actually use the data they gather from sensors and other precision technologies.

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