

Use of cover crops and grazing management on row crops as BMPs to reduce nutrient leaching

- Six-year study near Marianna to develop BMPs for using cover crops and grazing management with row crops to reduce nutrient loss and to improve soil health. Carbon sequestration and mitigation of greenhouse gases are also being assessed.
- Researchers installed drainage lysimeters that collect samples of water moving past the crop root zone. Samplers follow FDEP SOPs to ensure data quality. Samples are analyzed using certified methods.
- Preliminary results indicate that integrating legumes into grass pastures significantly reduces the nitrogen requirement of the pasture and nitrogen leaching to groundwater.
- Forage quality and cattle gain are being evaluated to promote producer confidence in the practices. Results suggest similar livestock gains from grass-legume pastures using a fraction of the nitrogen fertilizer that is used in grass monocultures, and that grazed systems can help attain comparable cotton yields without the additional, excess nitrogen.

Suwannee Valley farm-scale research to evaluate nutrient and water use efficiency and to support BMPs

- Long-term study (16-year) evaluating and demonstrating BMPs including rotation of agronomic crops with bahiagrass pasture and cattle grazing, use of soil moisture sensors to manage irrigation and fertilization, and following the 4R principles of nutrient management.
- Researchers installed drainage lysimeters that collect samples of water moving past the crop root zone. Samplers follow FDEP SOPs to ensure data quality. Samples are being analyzed by the FDACS AES laboratory using certified methods.
- Plant tissue and soil testing provide additional data on soil organic matter, nutrient requirements, and nitrogen accumulation in above-ground biomass.
- An important aspect of this project is demonstrating to producers that BMPs are achievable at farm-scale. Educational programs are frequent and on-going, and include field days, tours, and in-service training.

On-farm evaluation of rotational production systems to reduce nutrient inputs to groundwater

- Four-year study on a working farm in the Jackson Blue Springs basin to evaluate rotational production as a BMP to reduce nutrient leaching.
- A paired field study under a 160-acre pivot will compare traditional grower practices of 3-year peanut-peanut-cotton rotation to a 4-year rotational production system of bahia-bahia-peanut-cotton.
- Researchers installed drainage lysimeters that collect samples of water moving past the crop root zone. Samplers follow FDEP SOPs to ensure data quality. Samples are analyzed using certified methods.
- Data collection and analyses are underway to support the importance of field mapping, zone management for irrigation and nutrients, and the timing of nutrient application. Challenges of conducting large-scale research on a working farm are also being documented to understand natural and economic impacts.

Controlled release fertilizer/cover crop project

- Three-year plastic mulch tomato project in Central Florida comparing soluble urea applied via fertigation events to controlled release urea to measure nitrogen use efficiency.
- Study design incorporates winter and summer cover crops during fallow periods and will incorporate a bed geometry component in phase 2.



Rhizoma peanut as an alternative to mitigate environmental impacts from horse operations

- This two-year project is being conducted at three locations in Florida to demonstrate the effectiveness of mixed grass/perennial legume as an alternative to high rates of nitrogen fertilizers on horse pastures.
- Researchers are also evaluating rhizoma peanut hay for horses as a means of reducing nitrogen inputs on pastures. Three nitrogen fertilizer rates and detailed pasture variables are being assessed.
- Evaluations of horse health, feed preference, digestibility, nutrition, and amino acid profiles for selected forages are ongoing. Studies on amino acid profiles in forages are scarce and these data will help demonstrate sustainable pasture systems without negative impact to animal health and performance.

Demonstrating precision agriculture cropping methods and cover crops as tools to reduce nutrient leaching, and improve soil health in SRWMD

- For this multi-agency, five-year project, funds will be used to purchase equipment to demonstrate the precise placement of nutrients in the crop root zone and to evaluate cover crops as a practice to reduce nitrogen and irrigation use on five working farms.
- An economic analysis comparing farm costs prior to and following the use of precision agriculture methods and cover crops will be conducted.
- Farmers agree to host field days and educational events open to the public to provide producers with opportunities to discuss these tools, methods, and real-world budget numbers.

Nitrogen calibration strip as a tool to reduce nitrogen fertilizer input

- Researchers are using soil mapping to determine management zones for establishing nitrogen calibration strips at the time of cotton planting. Different nitrogen rates will be used in each strip.
- Plants in the calibration strip are evaluated for health and vigor at squaring growth stage in cotton; visual and sensor-based data will be compared to determine fertilizer rates for each zone.
- Plant health and vigor will be rated using spectral sensors Normalized Difference Vegetation Index (NDVI) collected with unmanned aerial vehicles (UAV) and NDVI meters.
- Results will help guide producer decisions about in-season nitrogen application in cotton. New and emerging crop management technologies using NDVI and UAV are improving nutrient and irrigation use efficiency across the U.S. Data are needed to demonstrate their use and importance in Florida.

Phosphorus bioavailability

- One-year accelerated lab study using iron-aluminum oxide test strips to measure phosphorus availability.
- Data will be compared to Mehlich-3 soil test results from a recently completed USDA study.

Phosphorus fertilization of potatoes

- Three-year potato fertilization study evaluating updated phosphorus recommendations on 4 private farms.
- Researchers are collecting weekly flow-weighted water quality samples to analyze nitrogen and phosphorus, and soil samples for calcium levels to compare to yield data.

Two-stage bioretention reactor

- Two-year study in SW Florida evaluating efficacy of biochar amended nutrients and pathogens in wastewater (best suited to dairy and nursery farms with discrete points of discharge).
- Researchers are “dosing” 55-gallon drums (bioreactors) with dairy wastewater influent.

