

Tools & Technologies for Manatee County, Florida Farmers

Improving Farmland Viability Through Precision Agriculture,
Conservation, and Emerging Technology

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Overview

Manatee County ranks **second in Florida for vegetable production** and is the state's **top producer of fresh market tomatoes**. Major crops include tomatoes (18,000+ acres), snap beans, watermelons, cucumbers, potatoes, peppers, cantaloupe, squash, and specialty crops. The livestock sector is valued at over \$35 million. Citrus production includes 91% oranges, 5% grapefruit, and 4% specialty fruits.

Tomatoes — Manatee County's #1 Crop

Technology	What It Does
Fertigation Systems	Delivers water + nutrients through drip lines, optimizing fertilizer use and reducing runoff.
AI-Powered Weed Mgmt	UF/IFAS prototype uses cameras + AI to ID weeds (85% accuracy) and spray them while avoiding crops (98% preservation).
Drone Nutrient Sensing	Sensors detect nitrogen in leaves; algorithms calculate exact fertilizer needs in real-time.
Soil Moisture Sensors	Real-time irrigation triggers based on root-zone moisture for Florida's sandy soils.

Peppers, Snap Beans & Row Vegetables

- **AI weed-spraying system** — Works across peppers and tomatoes with high accuracy
- **Variable-rate application (VRA)** — GPS-guided equipment adjusts rates based on soil maps
- **Drone crop scouting** — Detects disease, nutrient stress, and irrigation issues early

Watermelons, Cucumbers & Specialty Crops

- **Plastic mulch + drip irrigation** — Paired with sensor-based scheduling to optimize water use
- **Remote weather stations** — Hyperlocal data for disease prediction (e.g., downy mildew forecasting)

Citrus (91% Oranges, 5% Grapefruit)

- **HLB (Citrus Greening) management** — Sensor-based canopy detection for early ID of infected trees
- **Precision nutrient programs** — Compensating for HLB-damaged roots with site-specific fertilization
- **Thermal/multispectral drone imaging** — Detecting water stress and disease across groves

Cattle & Livestock (\$35M+ Sector)

Technology	What It Does
Virtual Fencing (GPS)	In use at Blackbeard's Ranch (Manatee/Sarasota) — invisible GPS boundaries, remote health monitoring.
RFID Traceability	FL Cattlemen's Assoc. program for supply chain tracking.
Rotational Grazing Apps	Digital paddock planning with satellite imagery for forage optimization.
GPS Ear Tags (10+ yr)	Real-time herd location, calving alerts, theft detection.

Cross-Cutting Technologies (All Crops)

Precision Agriculture

- **GPS-guided equipment** — Precision planting, fertilizing, and irrigation based on soil mapping
- **UF/IFAS drone programs** — Algorithms for irrigation management and nutrient demand for FL
- **AI & data-driven tools** — Expanding AI use for decision-making and crop monitoring

Soil Health & Conservation

- **Basaltic volcanic rock dust** — USDA-funded (\$750K, 4-year) study on soil productivity improvement
- **Cover cropping & conservation tillage** — Improves organic matter in sandy Florida soils
- **Best Management Practices (BMPs)** — Reduce nutrient loading while maintaining yields

Water Management

- **Precision irrigation** (drip, micro-sprinklers, sensors) — Critical for sandy soils
- **Manatee River Soil & Water Conservation District** — Local guidance on water management

Alternative & Emerging Agriculture

- **Hydroponic farming** — Soilless systems for efficient food production with less land
- **Seaweed/aquaculture** — Emerging opportunity for Florida's climate

Financial & Technical Assistance Programs

Program	Description
EQIP	USDA cost-sharing for conservation practice implementation
CSP	Payments for maintaining and improving existing conservation systems
CTA	Free technical help from NRCS/USDA for resource conservation planning
UF/IFAS Extension	Soil testing, pest management, financial strategies, educational programs
Manatee Soils Unit	Partners with NRCS/USDA to implement conservation tech on-site

Key Context

Florida growers suffered **\$3.1 billion in weather-related crop losses** (2025), with strawberries and blueberries hit 80–90%. Technologies that build climate resilience — protected agriculture, soil water retention, and improved forecasting — are increasingly critical for Manatee County's agricultural future.

Resources

- **UF/IFAS Extension Manatee County:** sfyl.ifas.ufl.edu/manatee
- **Manatee River Soil & Water Conservation District:** via Manatee County Ag & Extension Service
- **USDA NRCS Florida:** nrcs.usda.gov
- **Florida Cattlemen's Association:** floridacattlemen.org