Florida Water Availability and Water Needs In 2020, 2060

Chuck Aller

Florida Department of Agriculture and Consumer Services

February 28, 2008

Florida Agriculture Today

- 41,000 farms and ranches
- 14.3 million acres of agricultural land
- 9.7 million acres of timberland
- 4.6 million acres crop and pasture land (1.9 million irrigated acres)

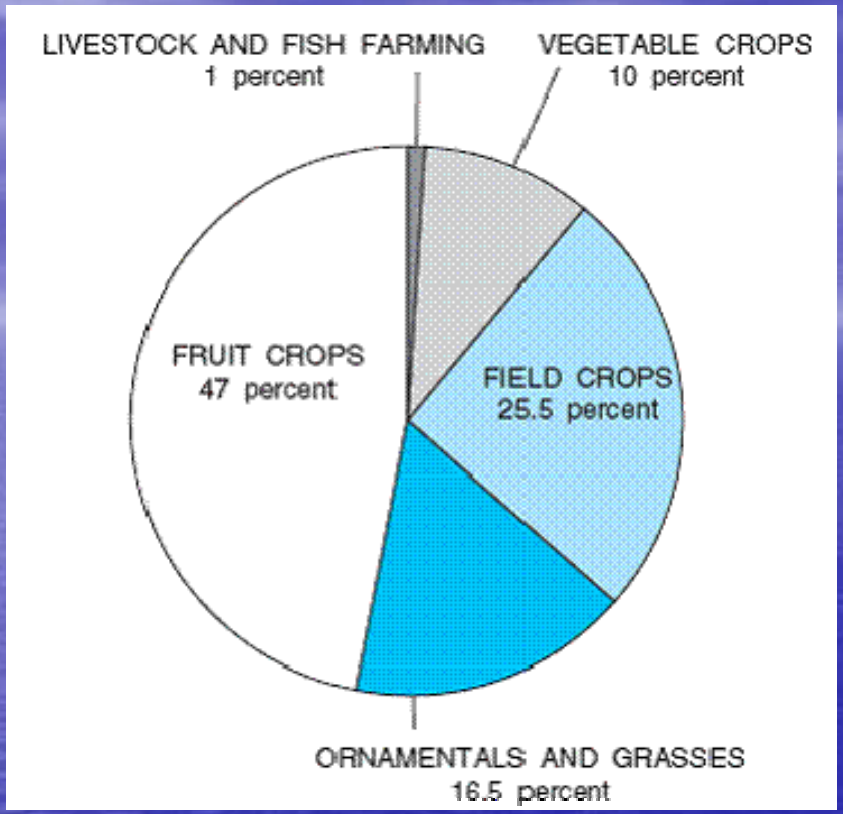
Florida Farm Facts

- Total economic impact of $97.84 billion
- Ranked 1st in the U.S. in the value of production of:
  - oranges (67%), grapefruit (61%), tangerines (52%)
  - sugarcane (47%)
  - fresh market tomatoes (35%), cucumbers (30%)
  - watermelons (26%), sweet corn, snap beans
- Ranked 2nd in the U.S. in sales of:
  - greenhouse and nursery products,
  - bell peppers (32%), squash, strawberries
- Ranked 11th in beef cows and 18th in total cattle
- 82 million trees are planted each year in Florida, making it one of the top four tree planting states in the nation

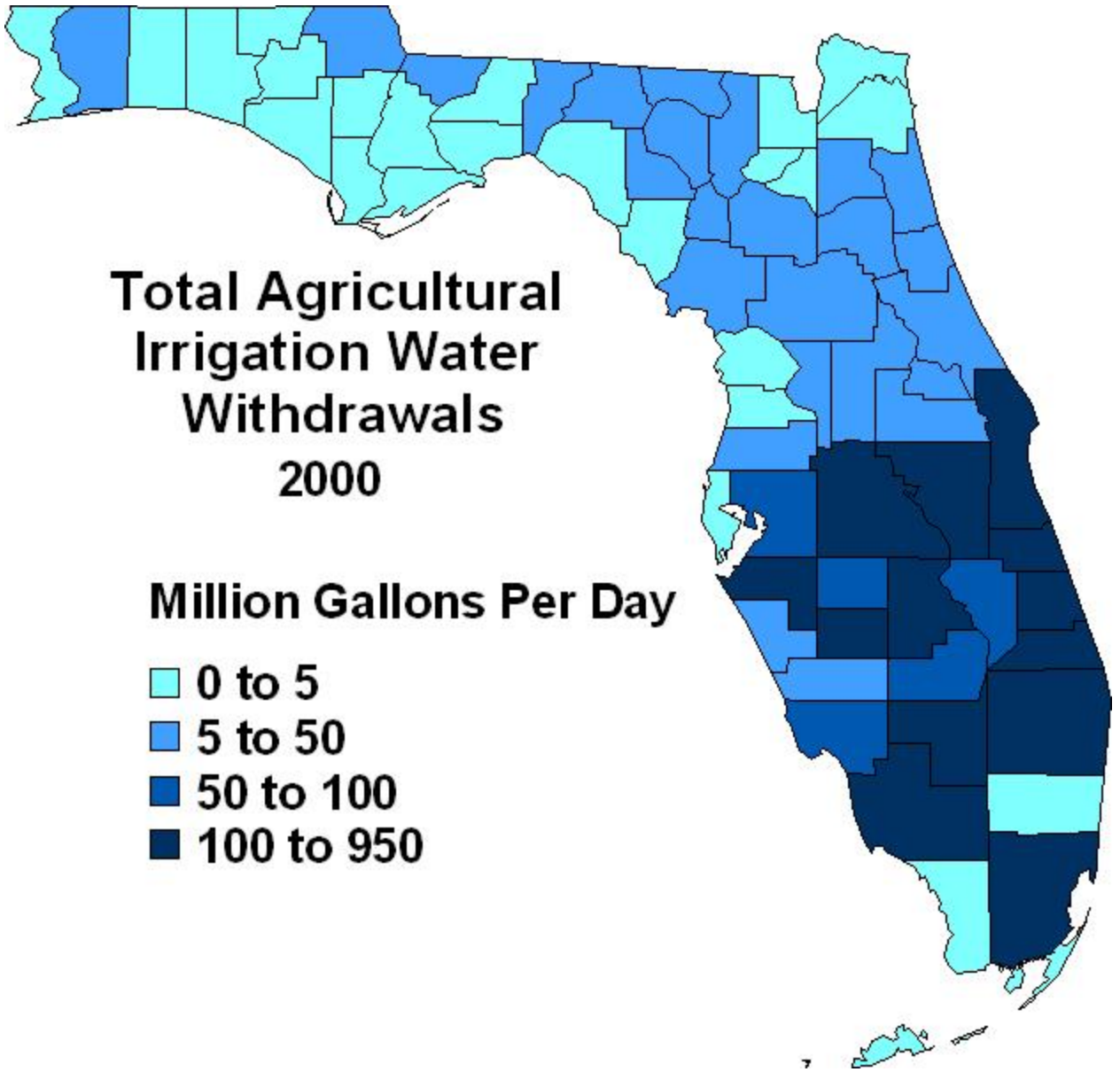


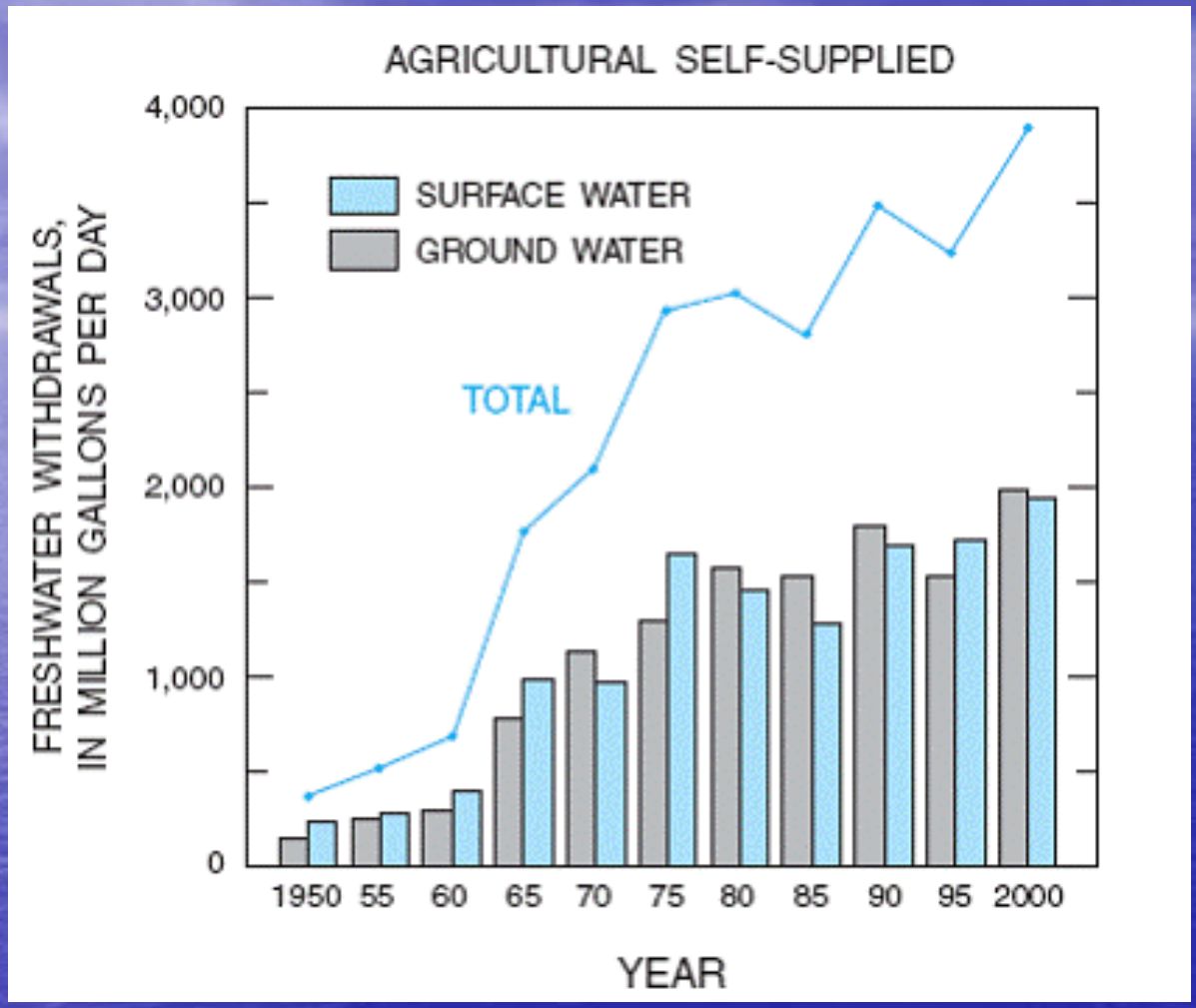



Source: Florida Agricultural Statistical Directory 2007

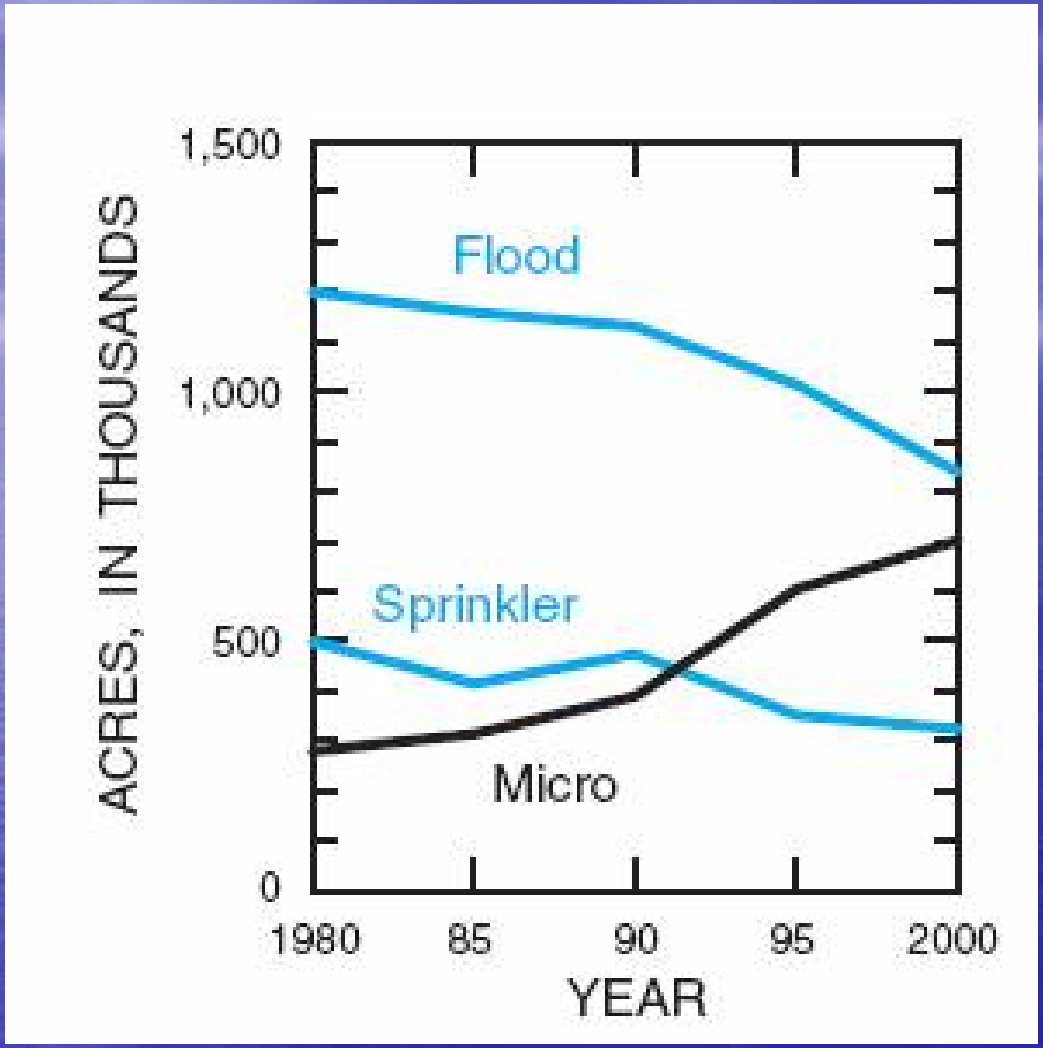


Agricultural self-supplied freshwater use in Florida by major crop type, 2000 (Marella, 2004)


Total Agricultural
Irrigation Water
Withdrawals
2000
Million Gallons Per Day
0 to 5
5 to 50
50 to 100
100 to 950



Historical agricultural self-supplied freshwater withdrawals in Florida by source, 1950 – 2000. (Modified from Marella, 1999)



Historical agricultural acreage irrigated in Florida by irrigation system type, 1980 – 2000 (Modified from Marella, 1997 and 1999)

DEP's 2025 Prediction - Agriculture

- 2005 Agriculture - 43% of fresh water use
  Public Supply – 37% of fresh water use
- 2025 Agriculture – 35% of fresh water use
  Public Supply – 43% of fresh water use
- Agriculture – 10% increase in total demand

Agricultural Water Use Planning

- Weather
- Markets
- International Trade
- Pests and Diseases

Agricultural Water Use Planning

- Tax Policy
- Environmental Concerns
- Growth Management
- Public Land Acquisition
- Water Availability

Water Availability

It is further declared to be the policy of the Legislature:

(d) To promote the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems.

Chapter 373.016, Florida Statutes

Water Availability

It is the intent of the Legislature that:

(a) Sufficient water be available for all existing and future reasonable-beneficial uses and the natural systems, and that the adverse effects of competition for water supplies be avoided.

Chapter 373.0831, Florida Statutes

Agricultural Potential in Florida

- National Food Security Issues
- Food Safety/Consumer Preference
- National Energy Policy and Bioenergy Production

Florida Energy Facts

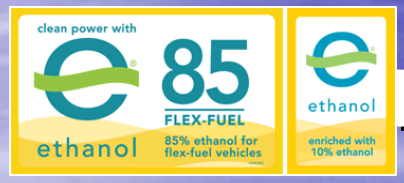
Transportation Fuel

- Florida depends almost exclusively on other states and nations for supplies of oil and gasoline
- Florida is the 3rd largest consumer of gas in the U.S. consuming more than 10 billion gallons of gasoline and diesel fuel each year
- No ethanol production
- Limited biodiesel production
- Limited ethanol and biodiesel availability

Electricity

- Florida's per-household consumption of electricity is among the highest in the United States
- More petroleum-fired electricity is generated in Florida than in any other State
- Florida's natural gas-fired electricity generation accounts for 11.4% of US share
- Renewables represent 3% of electricity generation – ranked 13th in US
- More than 70% generated from fossil fuels

uels



- **Ethanol** - An alcohol-based alternative fuel typically produced by fermenting and distilling starch crops that have been converted into simple sugars.
  - Can be blended with gasoline to create E85, a blend of 85% ethanol and 15% gasoline for use in flex-fuel vehicles or up to 10% for use in all vehicles.
  - Most prevalent feedstock is corn in the US and sugarcane in Brazil.
  - Cellulosic Ethanol - A blend of ethanol that can be produced from a great diversity of biomass including waste from urban, agricultural, and forestry sources.
  - Butanol
- **Biodiesel** - the mono-alkyl esters of long-chain fatty acids derived from plant or animal matter for use as a source of energy.
  - Can be blended with diesel to create a blend for use in all diesel powered vehicles. Typically used in small blends (5% to 20%).
  - Most prevalent feedstock is soybean although others show promise.
  - Renewable Diesel - Produced from renewable plant and/or animal feedstocks but not chemically similar to biodiesel
- **Biogas** - produced by the anaerobic digestion or fermentation of organic matter including manure, sewage sludge, municipal solid waste, biodegradable waste or any other biodegradable feedstock. Comprised primarily of methane and carbon dioxide.

Biomass in Florida

- 41,000 farms and ranches
- 4.6 million acres crop and pasture land
- 9.7 million acres of timberland
- 14.3 million acres of agricultural land
- 124 million tons of biomass potential
- Marginal land can used to grow energy crops

- Fast-growing trees and crops
- Agricultural residues
- Animal manures
- Forest debris and thinnings, undergrowth in timber stands
- Leftover materials from the wood products industry
- Urban wood waste
- Invasive species



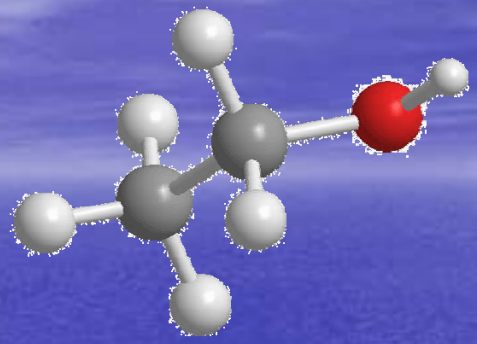


Potential Ethanol and Biodiesel Feedstocks

Corn		250-500 gal/acre
Sugar Cane		600-800 gal/acre
Sweet Sorghum		400-900 gal/acre
Biomass (124 million tons)		1000 gal/acre, 8-12 bgy
Bagasse (1 million tons)		80-100 mgy
Citrus Peel (5 million tons)		60-70 mgy
Soybean		48-60 gal/acre
Jatropha		200-1000 gal/ acre
Algae		5,000 - 15,000 gal/acre


Thank You

Types of Ethanol



Corn Ethanol

- Net energy gain 1:1.3^{+} / annual yield: 250-500 gallons per acre
- GHG Emissions: 22% less
- **Pros**: commercially viable, competitive price (currently)
- **Cons**: increased water consumption, potential impact on food prices, distribution hurdles

Sugarcane Ethanol

- Net energy gain 1:8 / annual yield: 600-800 gallons per acre
- GHG Emissions: 56% less
- **Pros**: higher gain and yield than corn
- **Cons**: environmental practices, too costly to produce ethanol from sugarcane grown in Florida

Cellulosic Ethanol

- Cellulose (e.g. vegetative wastes, citrus peels, bagasse, sweet sorghum, switchgrass)
- Net energy gain 1:2-36 / annual yield: 1,000+ gallons per acre
- GHG Emissions: 91% less
- **Pros**: local economic development, use on marginal lands, no fertilizers, does not compete with food production
- **Cons**: not demonstrated at commercial scale, high production costs, difficulty securing financing