Transforming Farming Systems on Public Lands in the EAA to Support Everglades Restoration

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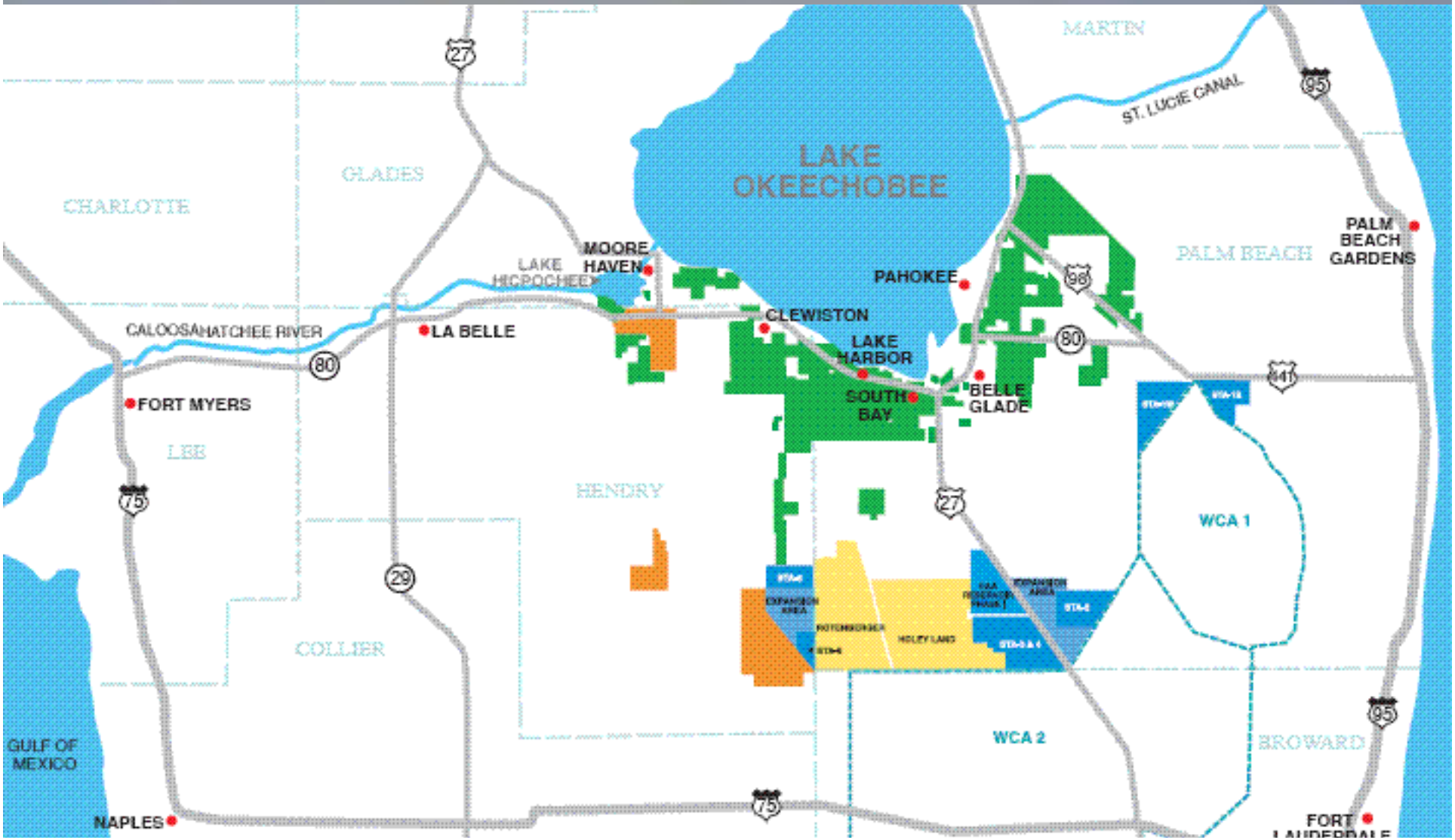
Presentation Objective

- **Discuss the opportunity that the public purchase of farm lands in the EAA provides for t*ransforming farming systems into truly sustainable systems.***

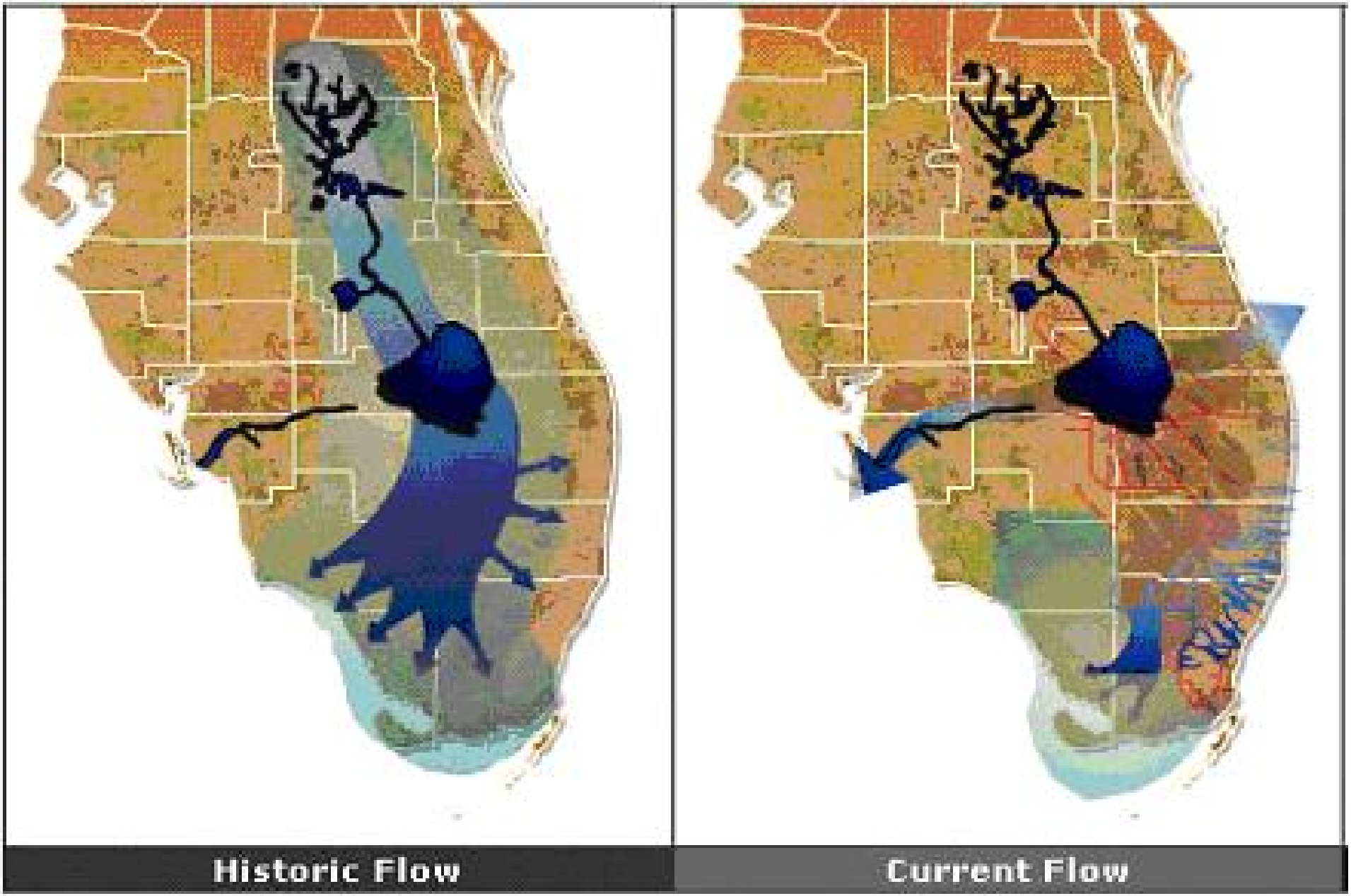
- **Present the concept that by reducing the yield-intensity of farms and adding ecosystem services, public farm lands can serve both restoration and the economy more effectively and more efficiently.**

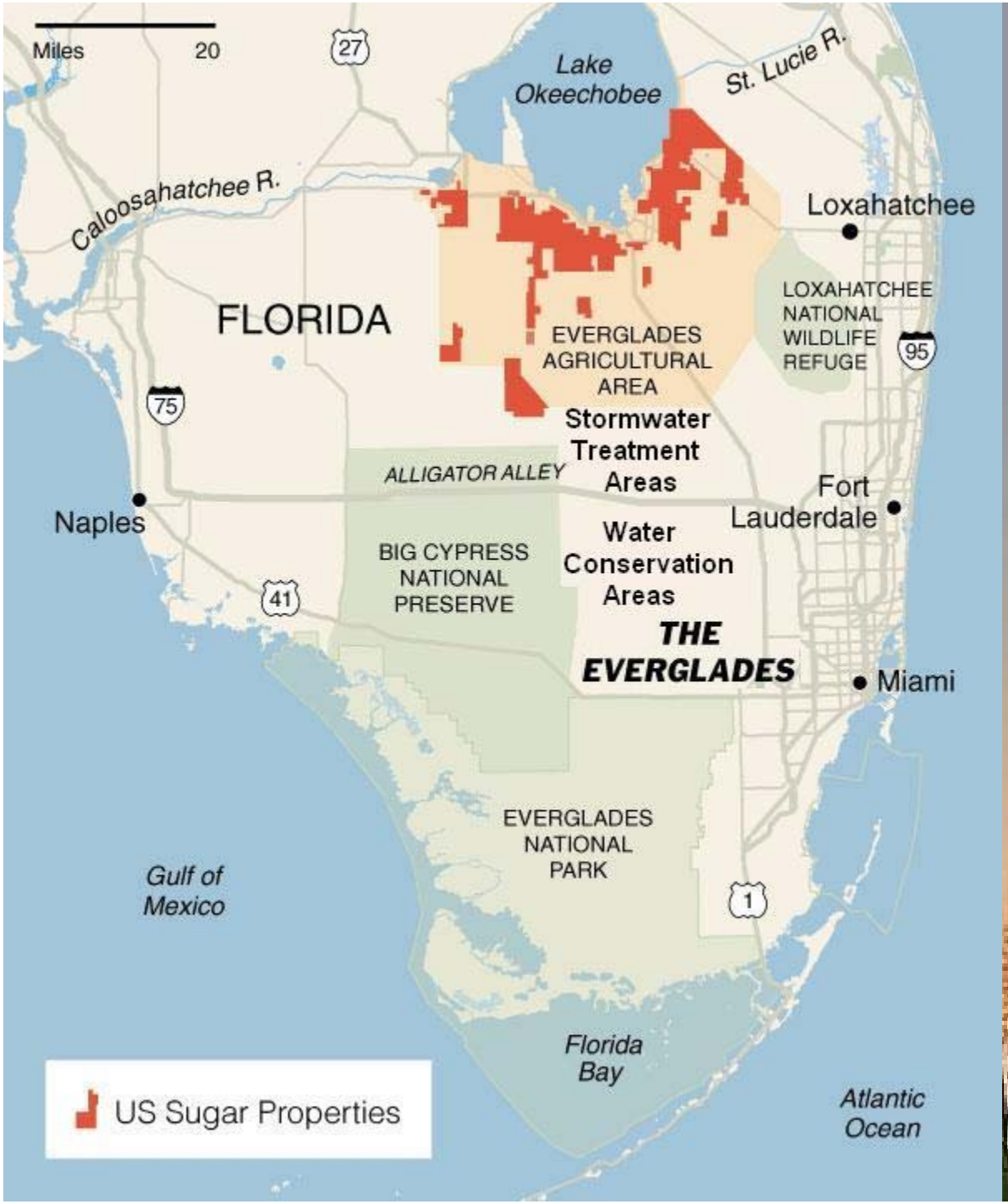
U.S. Sugar Lands Targeted for Purchase

Green = Sugar Fields Orange = Citrus Groves



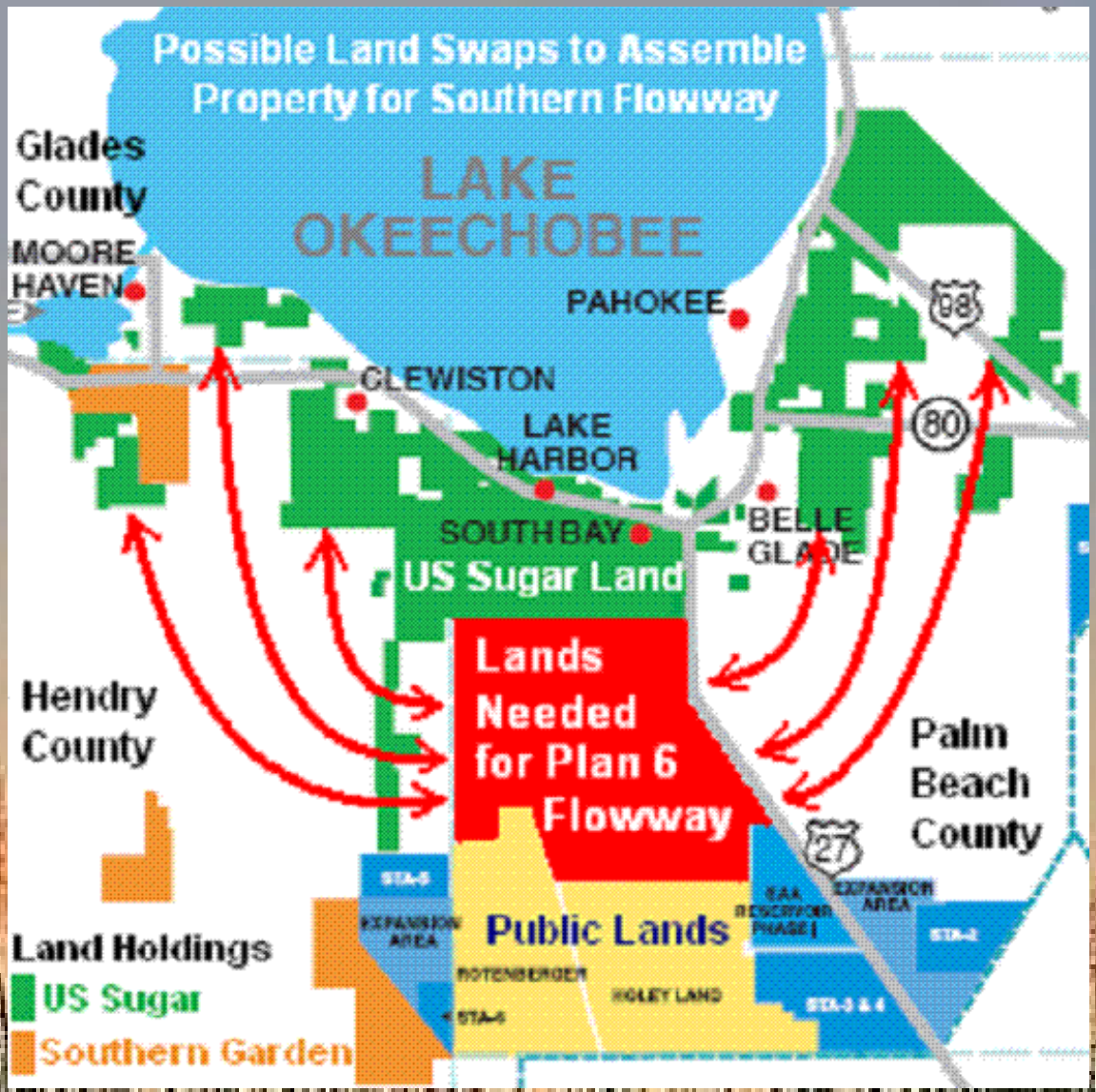
Historic vs. Current Water Flow





Lake O
to
EAA
to
STAs
to
WCAs
to
Everglades

Land Swap for Flow Way



Why Pursue a Different Approach?

- Threats to our ecosystem are global, not just local.
- These globally-influenced threats to the Everglades include migratory species vulnerability and long-term climate change combined with sea level rise.
- Eliminating Florida farms simply moves agricultural production overseas to nations using less environmentally-sensitive practices and promoting more land clearing (20% of GHG emissions).
- Substituting overseas agricultural for domestic production contributes to global environmental threats and thus yields no net ecological benefit.

The Opportunity

- Given the global threats to Everglades restoration, any set of solutions for south Florida problems needs to also address the global challenges.
- South Florida is uniquely positioned to lead in the creation of sustainable agricultural systems given its population, technology, and environmental restoration imperative.
- Florida should therefore aggressively focus on developing sustainable systems that deliver both agricultural production and environmental services.

Sustainable Farming Systems

- **The development and Implementation of new farming systems is an alternative to construction of STAs on the EAA purchased lands.**

- **The new farming systems require revenues derived from multiple income streams:**
  - **crop sales, waste by-products**
  - **energy generation, carbon credits**
  - **water storage, nutrient removal**
  - **wildlife habitat, etc.**

Sustainable Farming Systems

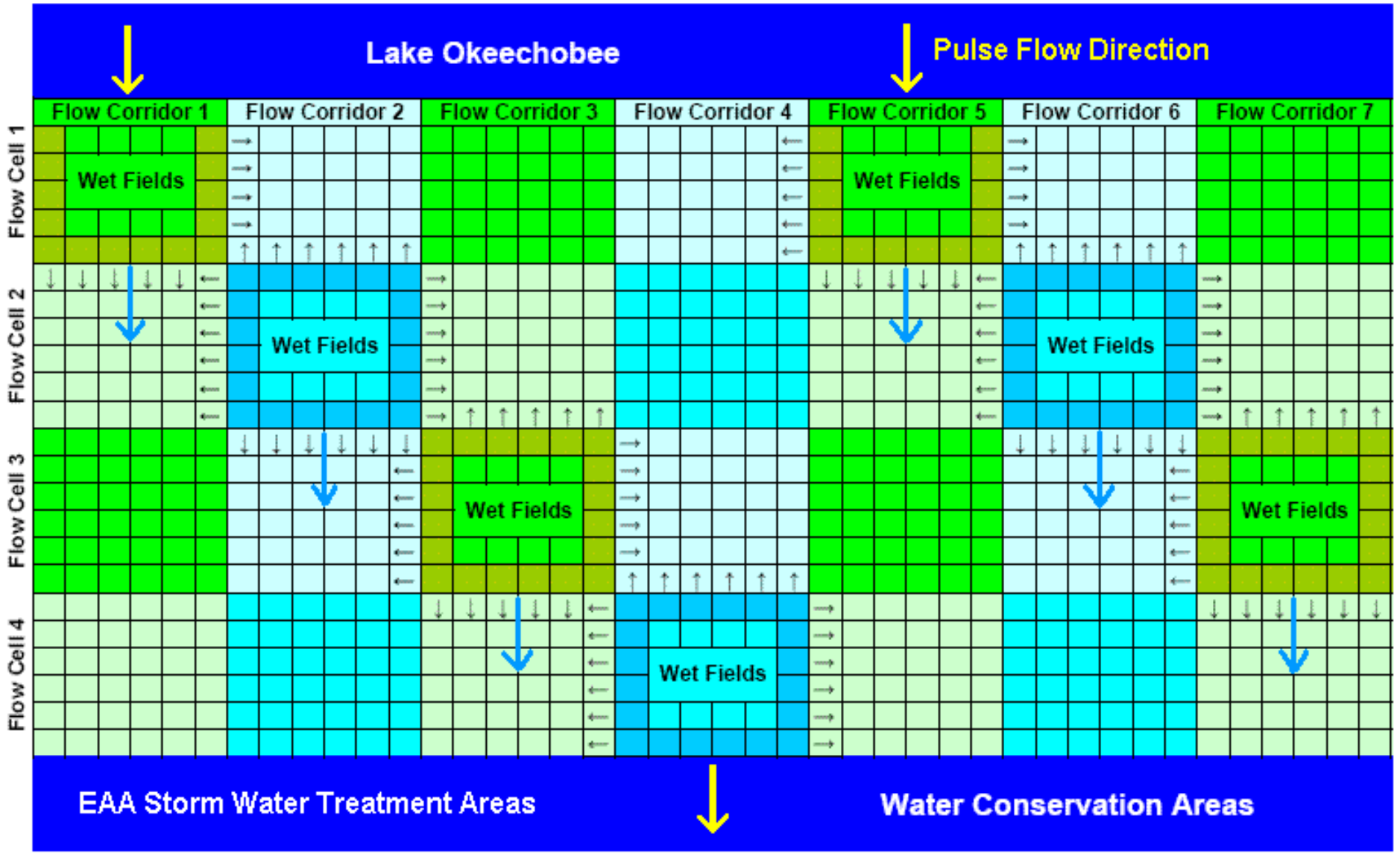
- **The creation and adoption of sustainable farming systems is different from the implementation of BMPs**
- **BMPs (fertilizer management, etc.) are modified practices intended to reduce negative environmental impacts within a given farming system.**
- **BMP-based solution still leave the farmer's economic survival focused primarily on yield.**

Sustainable Farming Systems

- Based on flood-tolerant sugarcane & other suitable crops.
- Allowing for greater water flow-through and/or storage on farms.
  (e.g. Recyclable Water Containment Areas)
- Reduction of muck soil loss (subsidence), a major factor in the carbon balance of EAA.
- Requires changes in many aspects of horticultural practices: crop rotations, fertility management, diseases & pests, farm operations & equipment.

Research Programs

Water Storage Services from New Farming Systems

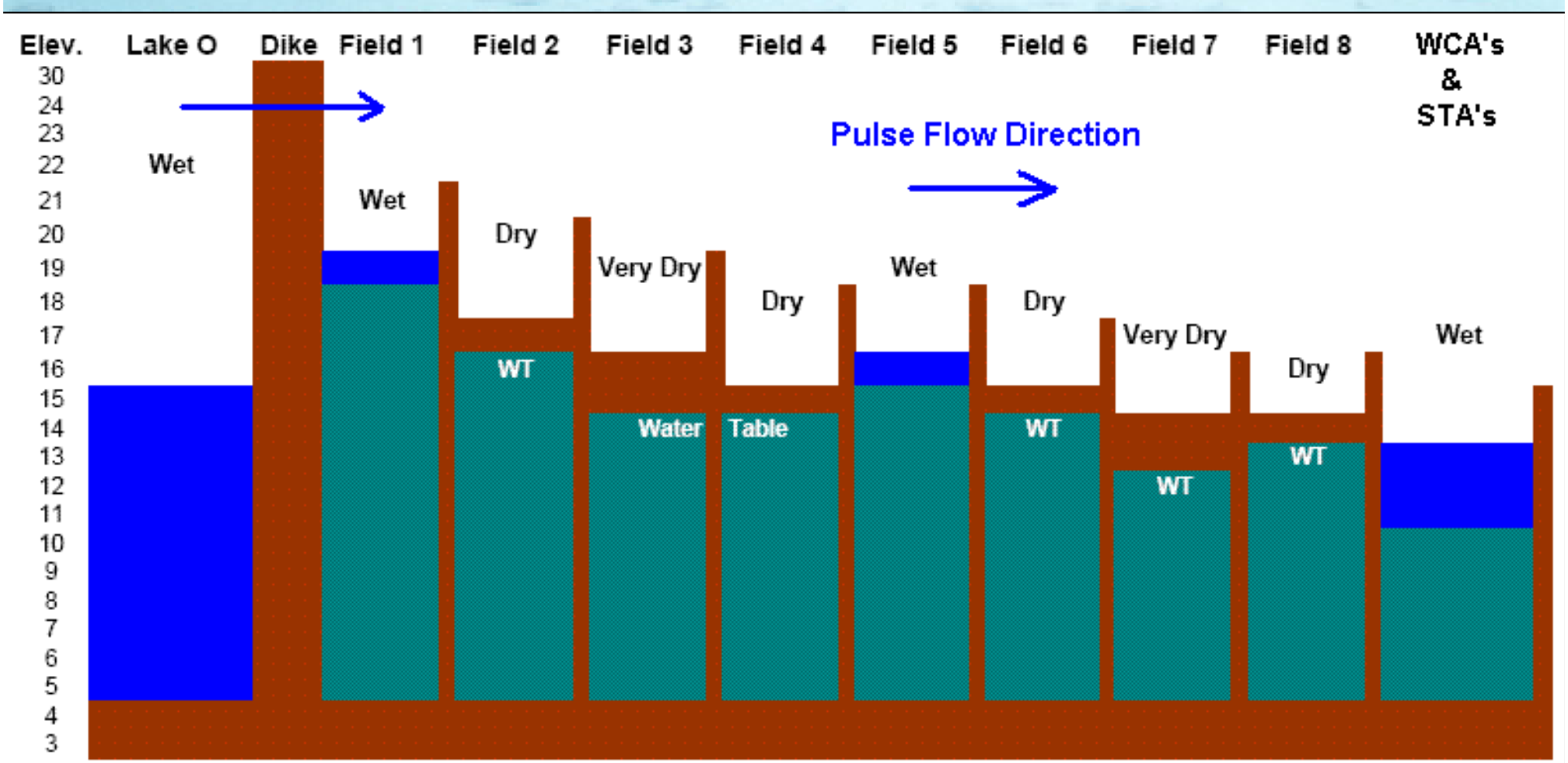


Research Programs

Water Storage Services from New Farming Systems

- potential dual use as flow way and farm land

- taking advantage of flood-tolerant sugarcane varieties



Research Programs

To determine if an EAA pulse-way strategy would work and meet the sustainability criteria requires analysis of:

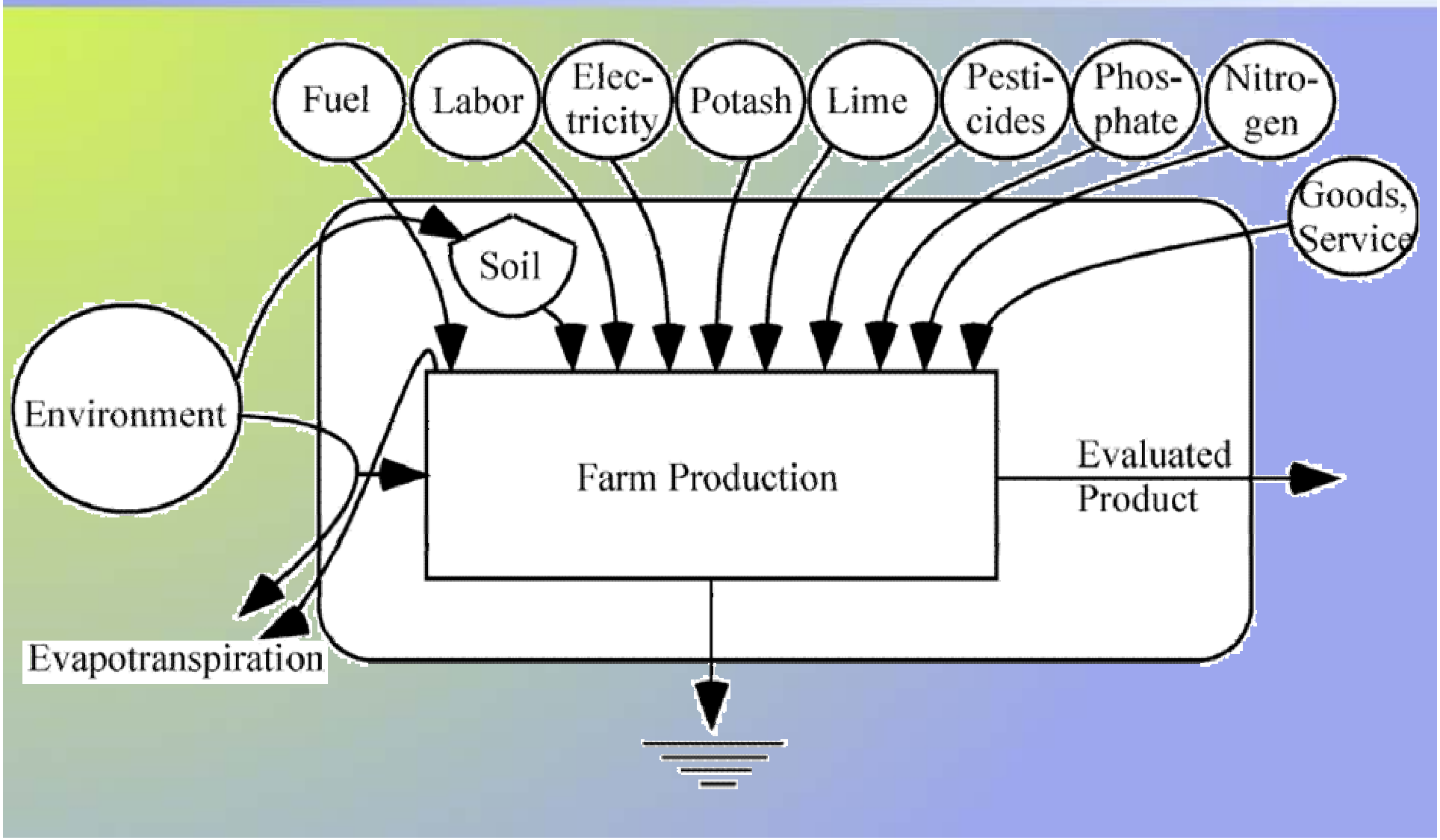
- **System Water Budget**
- **Soil & Water Nutrient Dynamics**
- **Prospects for New Sugarcane Varieties**
- **Soil Subsidence Reduction Opportunities**
- **Overall Energy and Carbon Budget**

Energetics – Total Energy Budget

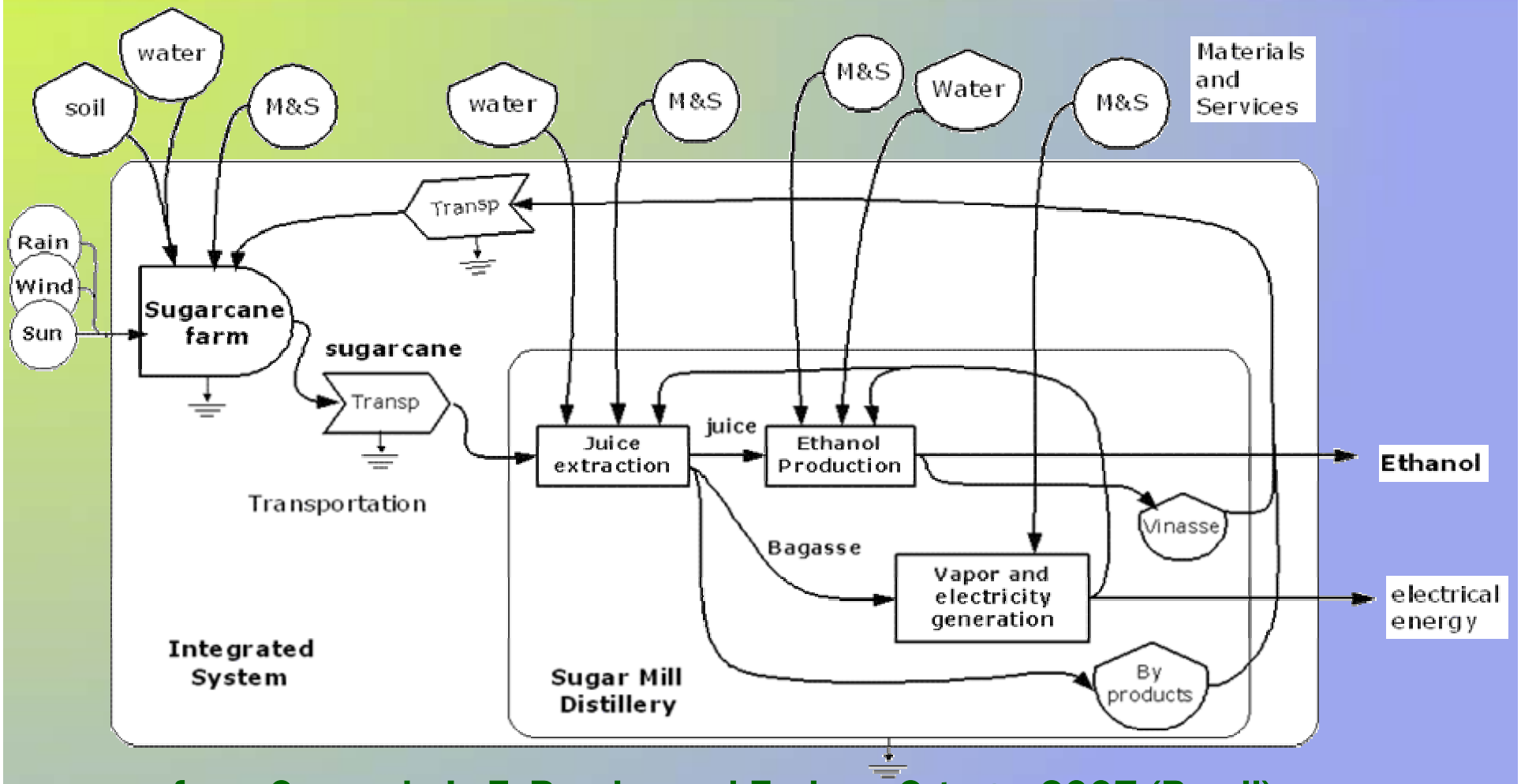
- **Energy accounting or the flows & storage of energy into and out of a system.**
- **H.T. Odum work at UF (with others including Mark T. Brown)**
- **Provides a more comprehensive analysis if, like traditional economics, all input, output, and impact categories are included.**

• The Emergy methodology offers economists and researchers models and tools as they struggle to do life-cycle analysis for carbon footprint and sustainability measures relative to water, nutrients and other factors.

Emergy (embodied energy) Analysis of Agricultural Production Systems



Emergy (embodied energy) Analysis of Sugarcane Ethanol

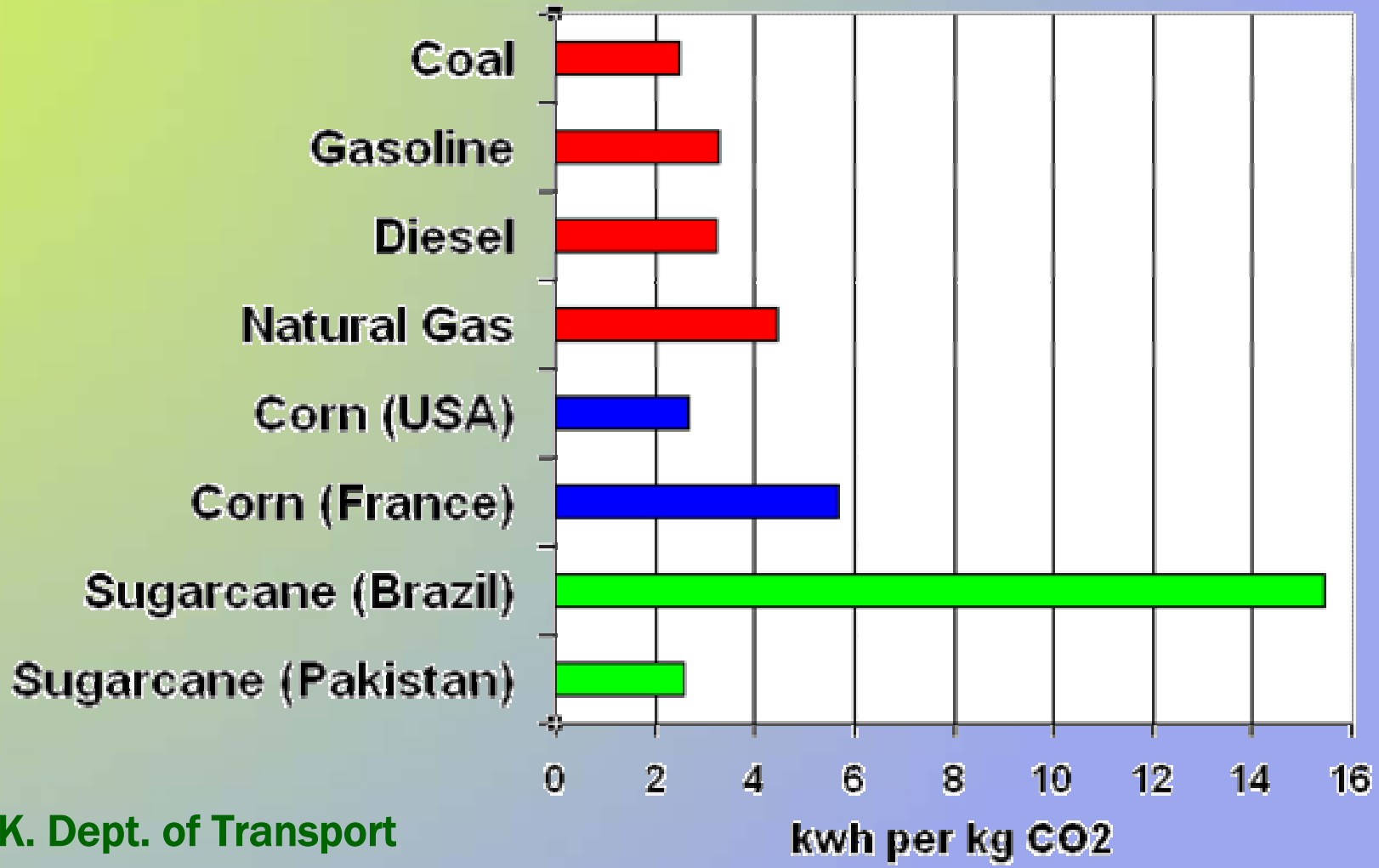


from Consuelo L. F. Pereira and Enrique Ortega, 2007 (Brazil)

Environmental Impacts Criteria

- Environmental Sustainability Index (ESI)
- Environmental Loading Ratio (ELR)
- Ecological Footprint
- Composite Sustainability Performance Index
- Green Biofuels Index

Net Energy Output & CO2 Emissions



from U.K. Dept. of Transport
Jan. 2008

Sustainability of Biofuels Production

- **Muck Soil Subsidence**
  - **40 tons/ac yield with 0.5” muck loss, 10 tons C**
- **Fertilizers & Pesticides Use**
- **Water Consumption**
- **Water Pollution**
- **Requirements of the biofuels refining process are highly dependent on the specific technology employed.**

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Presentation posted at:
www.CarbonCapture.us
www.CRCA.caloosahatchee.org