Landscape Research (Agriculture): From a Vision to an Implementation Strategy
[Concept /Background]

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My Journey Toward Landscape Research

Interactions were important to me before college and throughout my career

Soil/Water/Crop Effects of:

Wastewater Renovation
Hypomagnesemia
Farming Systems
Soil Quality/Health
Sustainable Feedstock
To Recognize and Work With Nature’s Diversity!

My Vision & Goal
Why is Diversity Important?
Diversity Fosters Sustainability

Where Sustainability Means

Economically viable
Environmentally sound
Socially acceptable

The concept evolved through several parallel activities:
Concept Evolution – Vision to Practices

1979-82 – Sustainable Feedstock Research in the SE U.S.
1988-03 – Farming Systems & Soil Quality/Health
2005-08 – BTS guided return to Sustainable Feedstock
2009 – NAS Liquid Transportation Fuels Study; AAAS mtg.
2010 – DOE Proposal “Methodologies for the Design and Assessment of Watershed-Scale Energy Crop Production Systems”
2011 – Chicago Council of Global Affairs – “Harnessing the power of biomass residuals”
2011 – CENUSA
2015 – Enabling Sustainable Landscape Design …
Landscape Diversity Provides:

- Feedstock for bioenergy/bio-products
- Enhanced nutrient cycling
- Multiple pathways for sequestering C
- Food, feed & fiber resources
- Filtering and buffering processes
- Wildlife food & habitat
- Soil protection & enhancement
- Economic opportunities for humankind
Why is Landscape Research Difficult?

Wicked Sustainable Feedstock Supplies

Tame Soil Erosion

Low Value Conflict High

It’s the Interactions

Adapted from S.S. Bete, 2010
Landscape Research Has Multiple Pathways

- Rapeseed
- Corn stover
- Corn grain
- High-oil Peanuts
- Switchgrass
- Cereal Straws
- Bagasse
- Oil palm
- Pennycress
- Wood chips
- Reed Canarygrass
- Cottonwoods
- Alfalfa
- Energy cane
Double Cropping for Biomass

- Growing cover crops (rye, triticale, brassicas) during the winter & early spring on “dedicated” corn or soybean land:
  - Does NOT require new land
  - Increases sustainable corn stover harvest rate
  - Provides additional biomass for biofuels, animal feed, etc
  - Reframes the “food vs. fuel” debate
Living Mulches
ROI Management

Soil and crop management practices, plant species selection and participation in Government Programs such as the CRP based on sub-field return on investment (ROI)
The Ultimate Goal: Healthy Soils → Healthy Landscapes → Vibrant Bio-Economies