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

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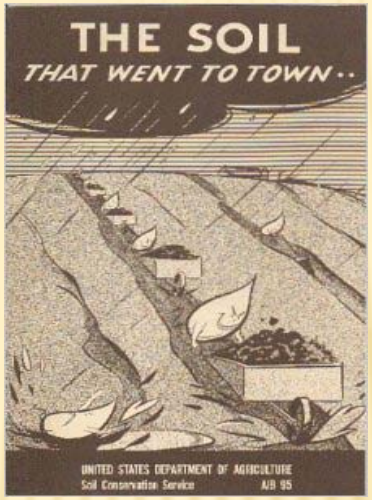
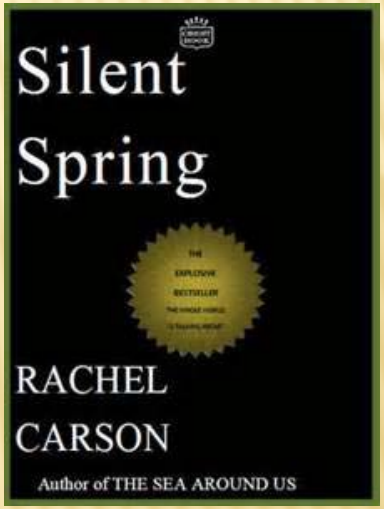
My Journey Toward Landscape Research

Interactions were important to me before college and throughout my career





Soil/Water/Crop Effects of:

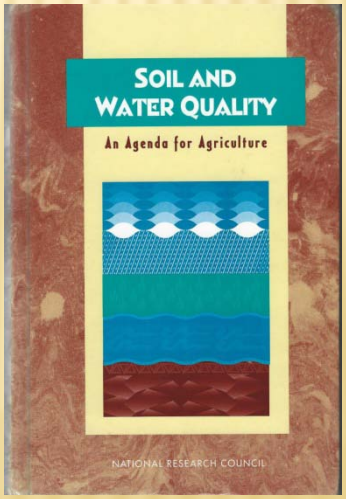
Wastewater Renovation

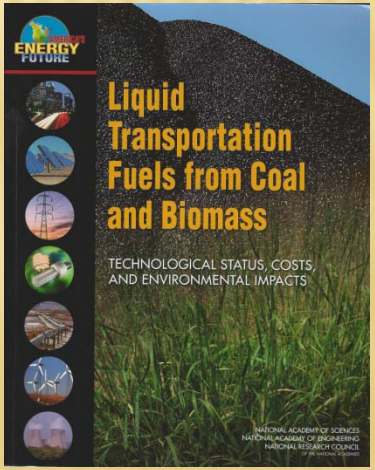
Hypomagnesemia

Farming Systems

Soil Quality/Health

Sustainable Feedstock





My Vision & Goal

To Recognize and Work With Nature's Diversity!

Why is Diversity Important?

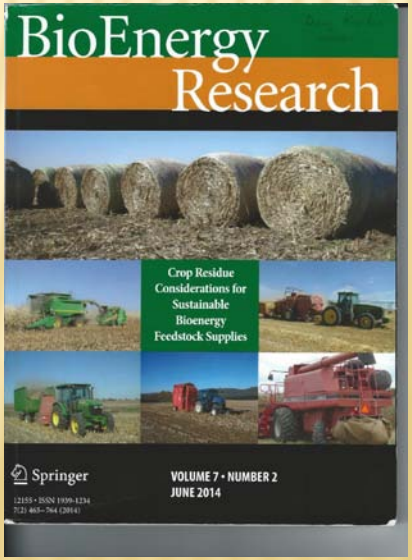
Diversity Fosters Sustainability

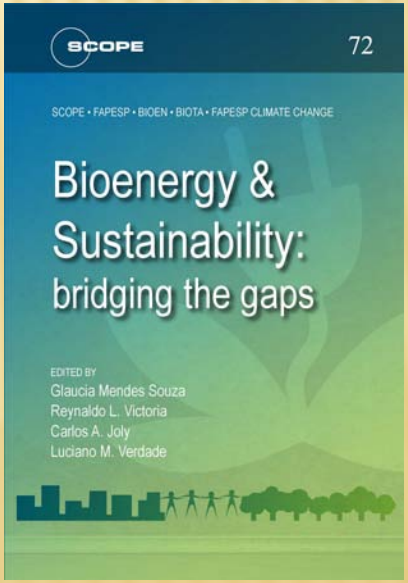
Where Sustainability Means

Economically viable
Environmentally sound
Socially acceptable

The concept evolved through several parallel activities:

Healthy Soils → Healthy Landscapes
Resilient Economic
REAP
Agricultural Practices
Vibrant Economies





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?

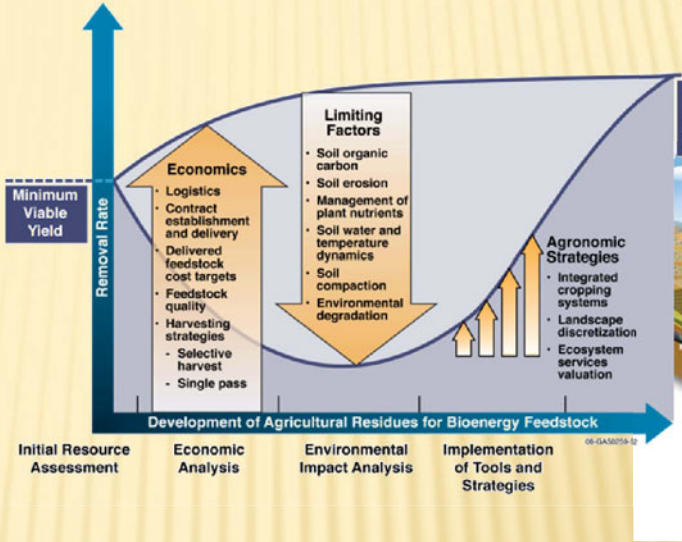
Uncertainty

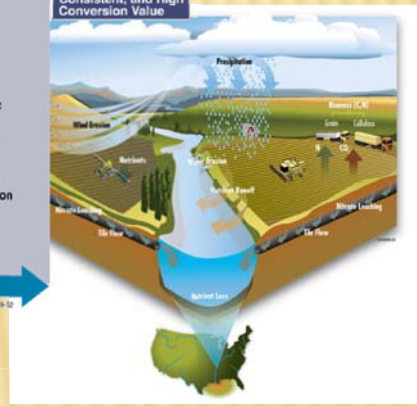
High

Low

Wicked

Sustainable Feedstock Supplies





Tame

Soil Erosion

Low

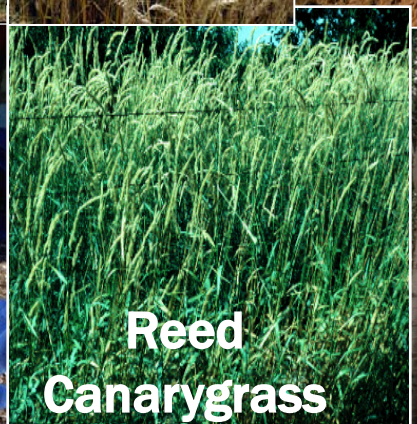
High

Value Conflict

It's the Interactions

Adapted from S.S. Bete, 2010

Landscape Research Has Multiple Pathways



Double Cropping for Biomass

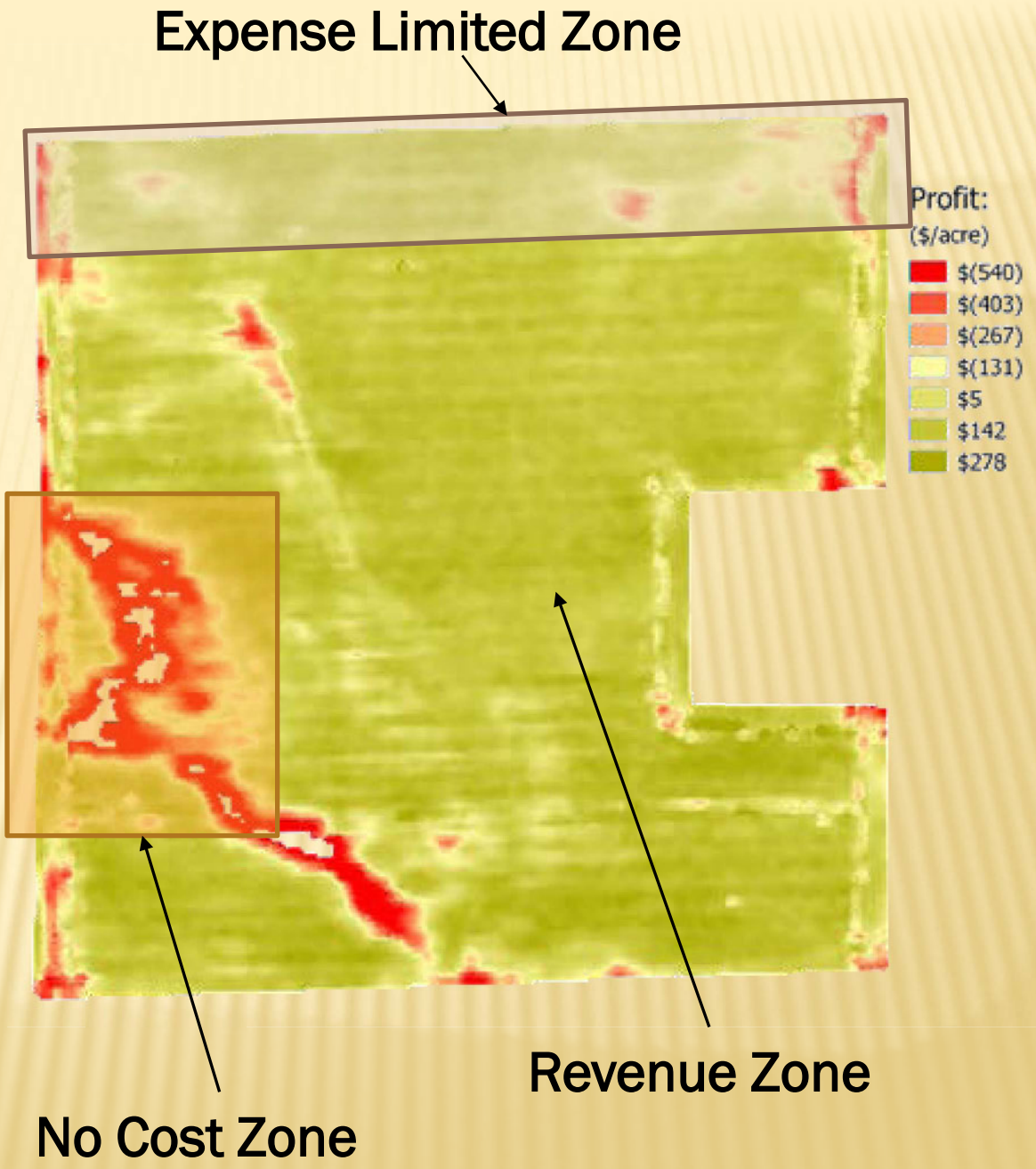
- Growing cover crops (rye, triticale, brassicas) during the winter & early spring on “dedicated” corn or soybean land:
  - Does NOT require new land
  - Increases sustainable corn stover harvest rate
  - Provides addition biomass for biofuels, animal feed, etc
  - Reframes the “food vs. fuel” debate

Holt, MI: May 5, 2005

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