Prototype Action Plan Component II: Sustainable Production Systems for Bioenergy

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USDA Energy Science and Education Strategic Plan

ARS Feedstock Production Research

USDA-NRCS

- Regional plans for growing appropriate feedstocks.
- Production systems and processes that are sustainable.
- Understand the implications of biofuel production to farmers and rural communities.

Growing a clean, efficient, sustainable energy future for America

USDA-ARS Bioenergy Research
Sustainable Production Systems for Bioenergy

The Sustainability Challenge

Servicing current demands for biobased energy without eroding the potential to meet future needs.

Emerging capacity to estimate effects of agricultural practices and policy decisions on economic and environmental returns.

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Sustainable Production Systems for Bioenergy

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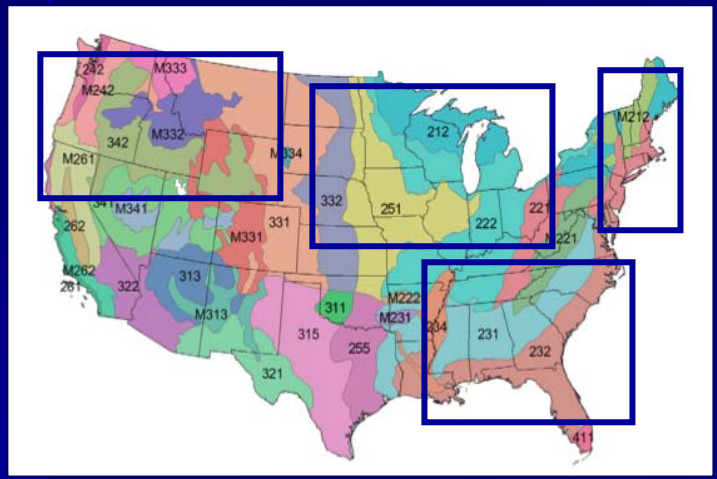
Sustainable Production Systems for Bioenergy

Research Subcomponents:

1. Sustainable strategies to increase feedstock production.
2. Analytical tools for incorporating feedstock production into farm operations.
3. On-farm utilization of conversion co-products.

Subcomponent 1. Sustainable strategies to increase feedstock production

- Assess amounts of feedstocks available within whole-farm operation cycles from diverse systems.



Producers face many challenges when considering how to manage different commodities across diverse environments.

The is no “one size fits all” solution for feedstock production.

Subcomponent 1. Sustainable strategies to increase feedstock production

- Assess amounts of feedstocks available within whole-farm operation cycles from diverse systems.

- Determine amounts of energy crops, crop residues, and post-harvest wastes produced.
- Develop guidelines for the sustainable use of biomass.

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Subcomponent 1. Sustainable strategies to increase feedstock production

- Develop management practices to increase the amounts of bio-based energy that can be produced.

- Cover crops to enhance soil carbon for greater biomass removal.
- Identify rotation configurations to incorporate energy production into existing food and feed systems.
- Develop sustainable practices for use of perennial forages as feedstocks.

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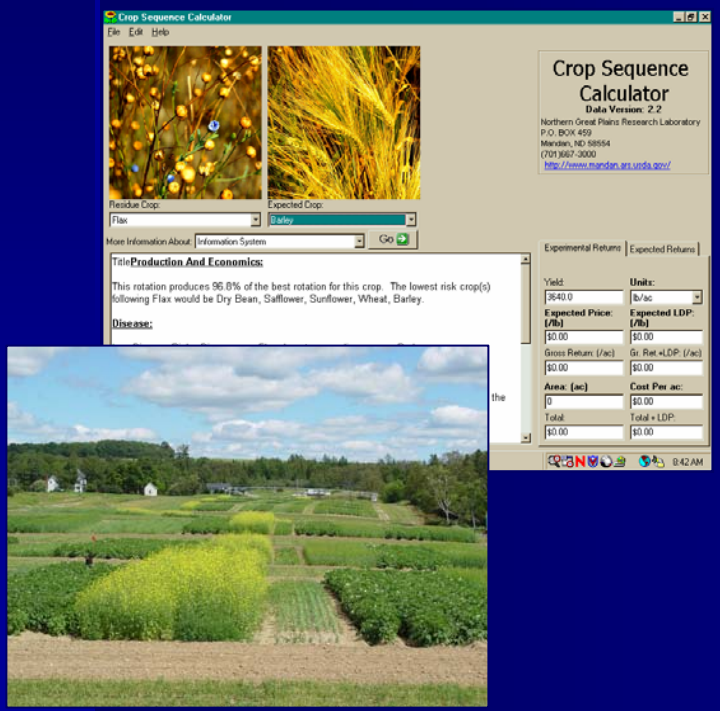

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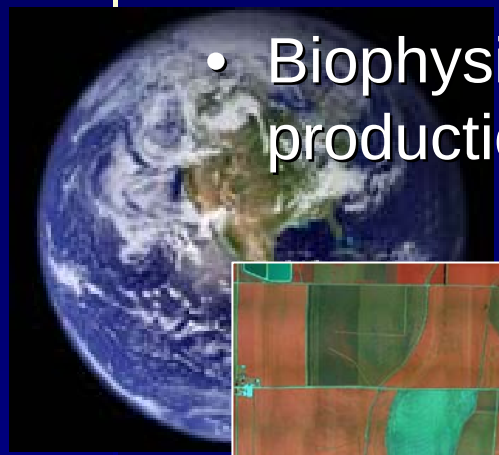
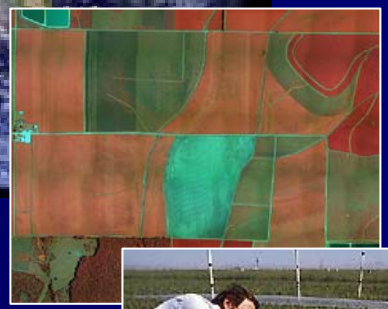
Subcomponent 2. Analytical tools for incorporating feedstock production into farm operations

- Biophysical impact modelling of feedstock production and natural resources processes.





- Models that predict the effects of management and changing climate on biomass production and crop yield.
- Apply models to predict the effects of feedstock production on natural resources processes and quality.

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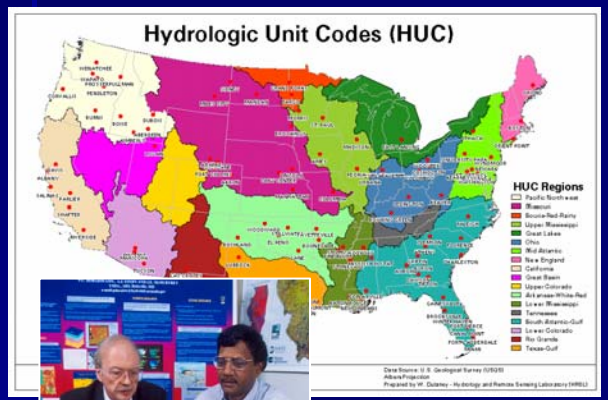

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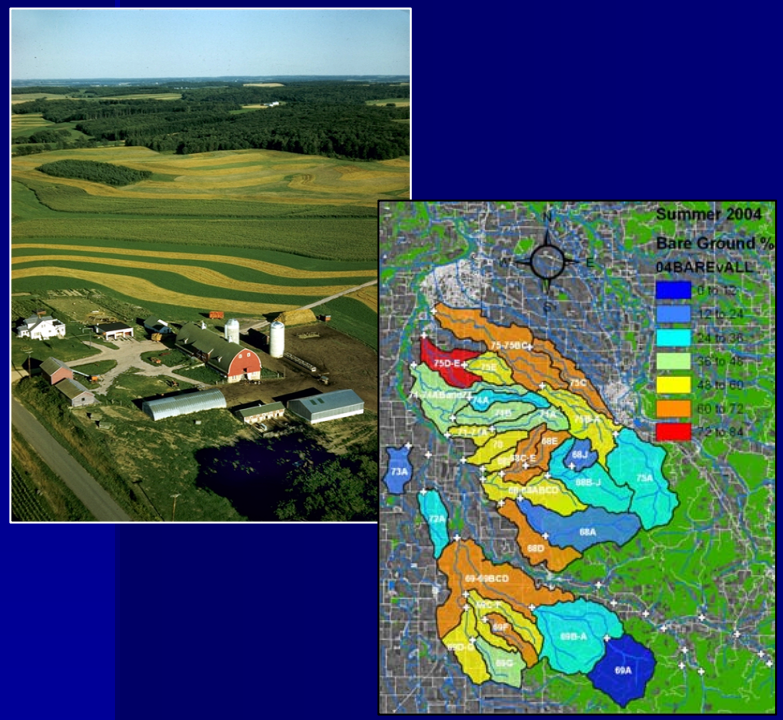
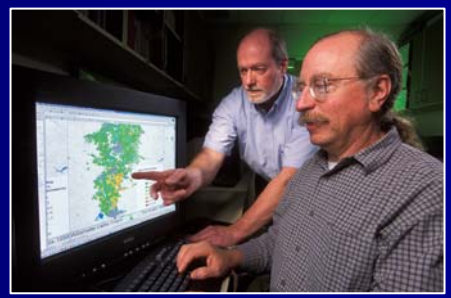
Subcomponent 2. Analytical tools for incorporating feedstock production into farm operations

- Optimization tools to estimate economic and environmental costs/benefits of bioenergy production.



- Integrated analyses for decision making at the whole-farm and landscape-levels.



Subcomponent 3. On-farm utilization of conversion co-products.

- Utilize residues from bio-based energy conversion.

- Determine the biological activity of residues from ethanol production and bio-char from pyrolysis on soil properties.
- Determine chemicals in reactor ash and value as soil amendments.

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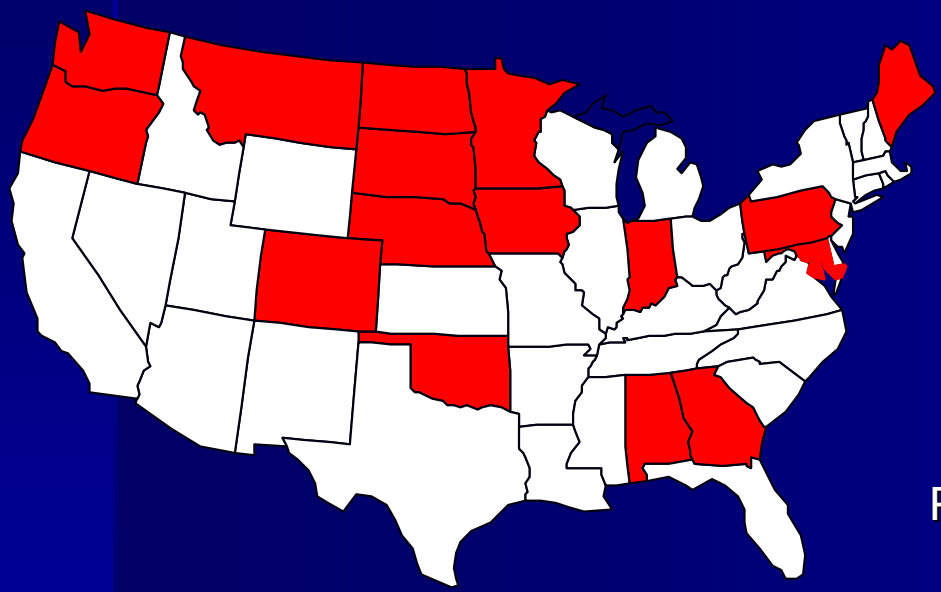
Contributing Locations



Ames, IA
Auburn, AL
Beltsville, MD
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Corvallis, OR
Dawson, GA
El Reno, OK
Fort Collins, CO
Lane, OK
Lincoln, NB
Mandan, ND
Morris, MN
Orono, ME
Pendleton, OR
Prosser, WA
Pullman, WA
Sidney, MT
St. Paul, MN
University Park, PA
Watkinsville, GA
West Lafayette, IN