OVERVIEW OF CSREES SUPPORT FOR BIOENERGY

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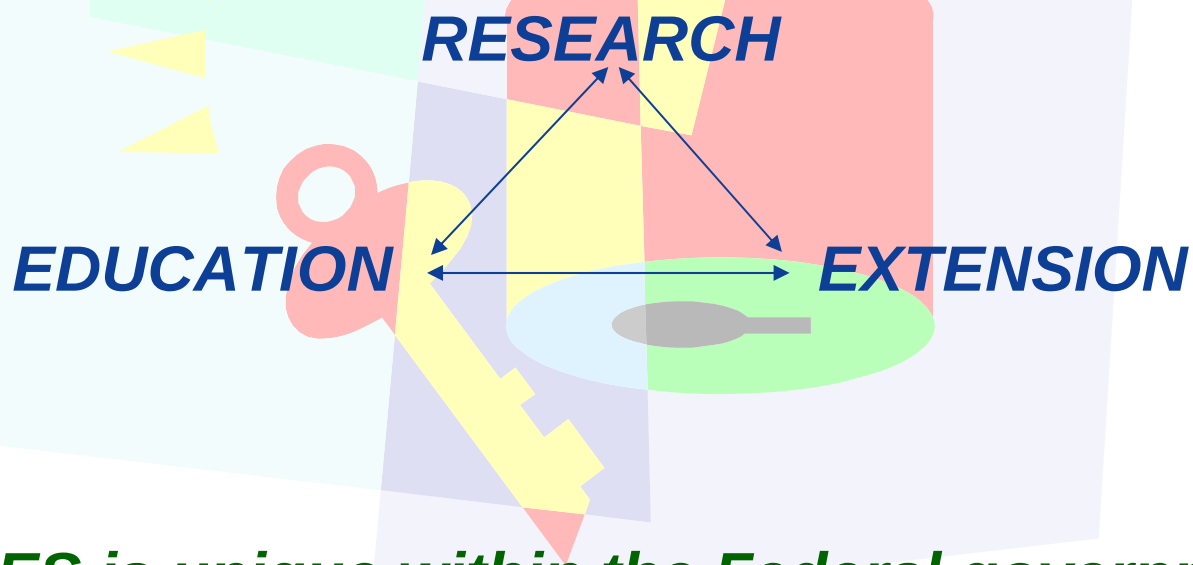
Agenda

1. Who is CSREES?
2. Research, Education, Extension
3. 2002 Farm Bill, Title IX Energy
4. Interagency Collaborations

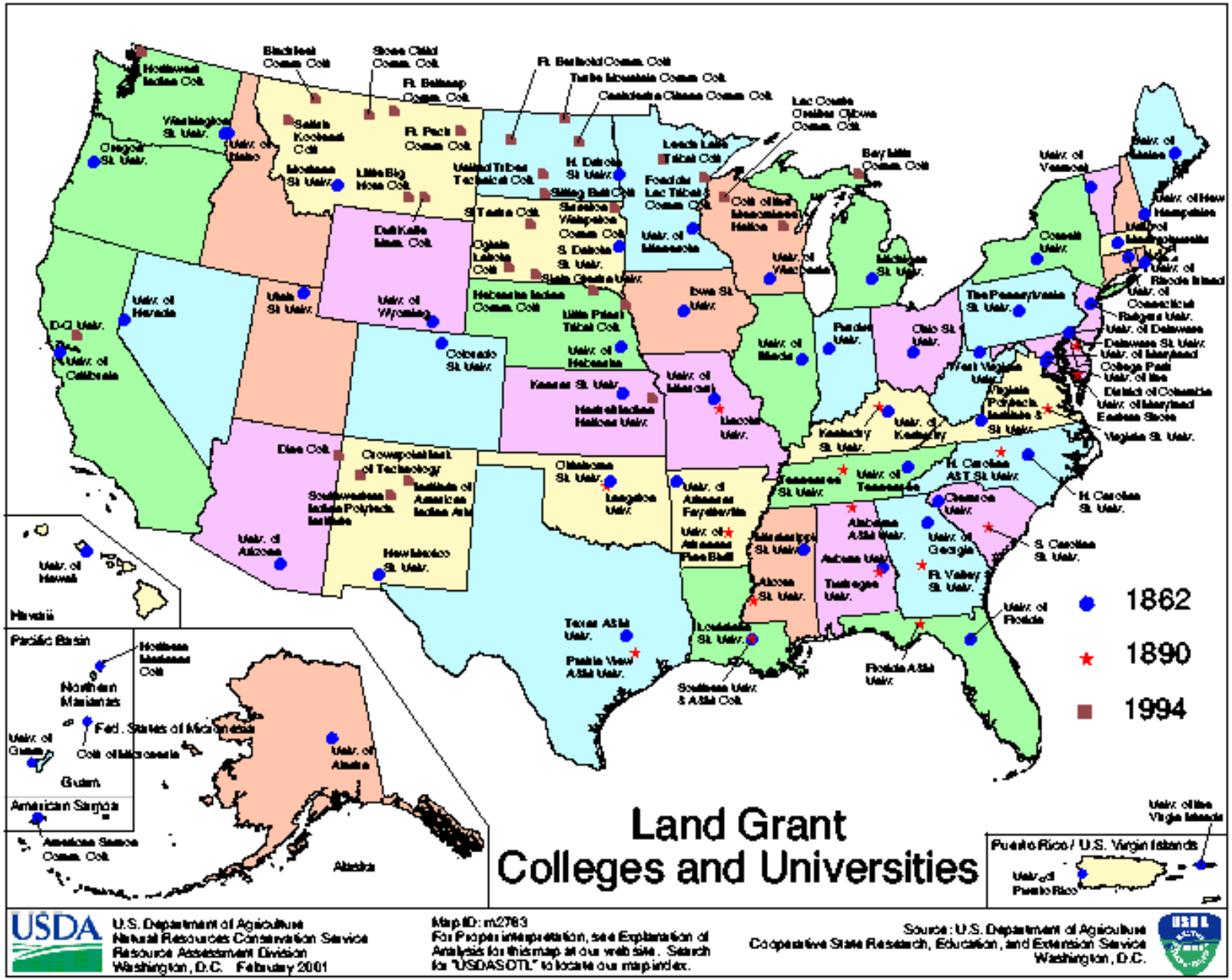
COOPERATIVE STATE RESEARCH EDUCATION, EXTENSION SERVICE

- ***Mission: To advance knowledge for agriculture, the environment, human health and well being, and communities***

- ***Multifunctional linkage:***



- ***CSREES is unique within the Federal government***


1862
1890
1994
Land Grant
Colleges and Universities
Hawaii
Pacific Basin
Northern Marianas
Guam
American Samoa
Alaska
Puerto Rico / U.S. Virgin Islands
USDA
U.S. Department of Agriculture
Natural Resources Conservation Service
Resource Assessment Division
Washington, D.C. February 2001
Map ID: m2783
For Proper Interpretation, see Explanation of Analysis for this map at our web site. Search for "USDASOTL" to locate our map index.
Source: U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Washington, D.C.
CSREES
EDUCATION
USDA
RESEARCH • EXTENSION

CSREES PROGRAMS

- National Research Initiative – competitive
- Small Business Innovation Research Program –competitive
- Agricultural Materials Program
  - Formula Programs
  - Special Research Grants-Earmarks
- FY 06 Budget $20.8M ($5.1M bioenergy)
- Other programs – Higher Education, SARE, Biodiesel Fuel Education Program

CSREES RESEARCH

Biomass Conversion to Energy/Chemicals

- lignocellulosic pretreatment technologies
- biocatalysts
  - enzymatic hydrolysis
  - efficient fermentation of sugars to ETOH
- gasification/fermentation
- pyrolysis – bio-oils
- transesterification of vegetable oils-biodiesel
  - Enzymes, chemical conversion

CSREES RESEARCH

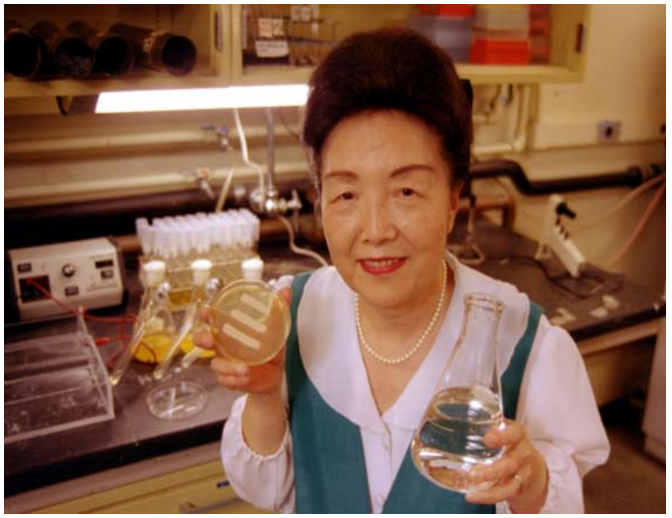
National Research Initiative Biobased Products Bioenergy (71.2)

- Development of technologies for effectively converting agricultural (including forestry) lignocellulosic materials for biofuel production
- Improvement/development of biocatalysts for hydrolyzing lignocellulosic materials to produce lower cost feedstocks
- Innovative non-food uses for ag residuals and under-utilized co-products

Genetic Engineering of Yeast for Co-Fermenting all Five Cellulosic Sugars to Ethanol

Objective

- Improve the conversion of biomass to ethanol
- Develop a *Saccharomyces* yeast capable of fermenting both glucose and xylose



Approach

Researchers altered the genetic structure of the yeast so that it now contains three additional genes that make it possible to simultaneously convert glucose and xylose to ethanol

Impact

- Ethanol Production from Wheat Straw increased 30-40%
- Technology transferred to a Canadian biotech company which currently uses the genetically modified yeast for ethanol production

CSREES EDUCATION RESEARCH EXTENSION USDA

CSREES RESEARCH

Other NRI programs relevant to biofuels

- Genetic Processes and Mechanisms of Agricultural Plants
- Agricultural Plant Biochemistry
- Developmental Processes of Agricultural Plants
- Plant Genome
- Rural Development

CSREES RESEARCH

SBIR Topics to Support Bioenergy

- Grants to Small Businesses to encourage technology development and commercialization

- Bioenergy is overarching theme for FY 2007
  - Biofuels
  - Co-Product Development
  - New Energy Crop Development

- Industrial Applications, Forestry, Rural Development, Manure Management

CSREES EDUCATION

- **Higher Education Challenge Grants Program**
  - **Biorefinergy Process Analysis and Design**
    - **University of Idaho**
    - **Curriculum development for engineering fundamentals of a biorefinery**
  - **Providing Education Research Training for the Biobased Products Industry and Bioeconomy**
    - **University of Minnesota**
    - **Lab exercises biomass analysis, conversion**

CSREES EXTENSION

- **Wood Biomass/Alternative Farm Product**
  - State University of New York, Syracuse
  - Willow as feedstock for bioenergy and bioproducts
  - Demonstration farms – crop production, harvesting

- **Sustainable Agricultural Research and Education (SARE)**
  - Awards for projects with renewable energy, energy conservation components
  - Western and Southern regions included renewable energy in solicitations

FARM BILL TITLE IX - ENERGY

- **Section 9004. Biodiesel Fuel Education**

  Education on Benefits of Biodiesel Fuel Use

  $1M FY 2003-2007

  2 continuation grants made in September 03 to National Biodiesel Board and University of Idaho

  www.biodiesel.org

FARM BILL TITLE IX - ENERGY

- **Section 9008. Biomass Research and Development**
  - **Implements Biomass Research and Development Initiative**
  - **Authorizes $14M/year FY 2003 through FY 2007**
  - **As amended by 2005 Energy Policy Act, authorizes $200M annually FY 2006 through FY 2015**
  - **Joint solicitation with DOE Office of Biomass**
  - **CSREES and NRCS responsible for transfer of technology and information generated under the initiative**
    - **Multi-state committee S-1007: Science and Engineering for a Biobased Industry and Economy**

FARM BILL TITLE IX - ENERGY

- **Section 9011. Sun Grant Initiative**
  - South Dakota State, Oregon State, Oklahoma State, University of Tennessee, Cornell
  - R&D, implementation of biobased technologies
  - Planning grants with CSREES funding
  - $1.5M from DOE in FY 05 to develop biomass monographs, fellowships to DOE labs, curriculum development for distance education
  - $40M from DOT through 2009 for regional competitive projects
    - http://sdaes.sdstate.edu/sungrant/

CSREES Interagency Collaboration

- Joint Solicitation with DOE Office of Science
- Plant Feedstock Genomics for Bioenergy
  - Regulation of genes, proteins and metabolites for manipulation of recalcitrant lignocellulosics
  - Development of novel technologies for the analysis and manipulation of cell wall structure/composition.
  - Genomic approaches leading to genetic markers for more efficient plant breeding.
  - Understanding of the structure, function, and organization of plant genomes for improved feedstock characterization.
  - FY06, 9 awards, $5.7M, poplar, alfalfa, wheat, sorghum
  - http://genomicsgtl.energy.gov/

Opportunities for Coordinating with ARS

- Multi-state research committees – S1007
- Recipients/collaborators on competitive awards
- Provide stakeholder input – when RFAs are announced
- Co-location on campuses
- Post-Doc appointments
- Student employment/visitation
- Adjunct professors
- Sabbaticals