Prototype Component 1: Bioenergy Feedstock Development

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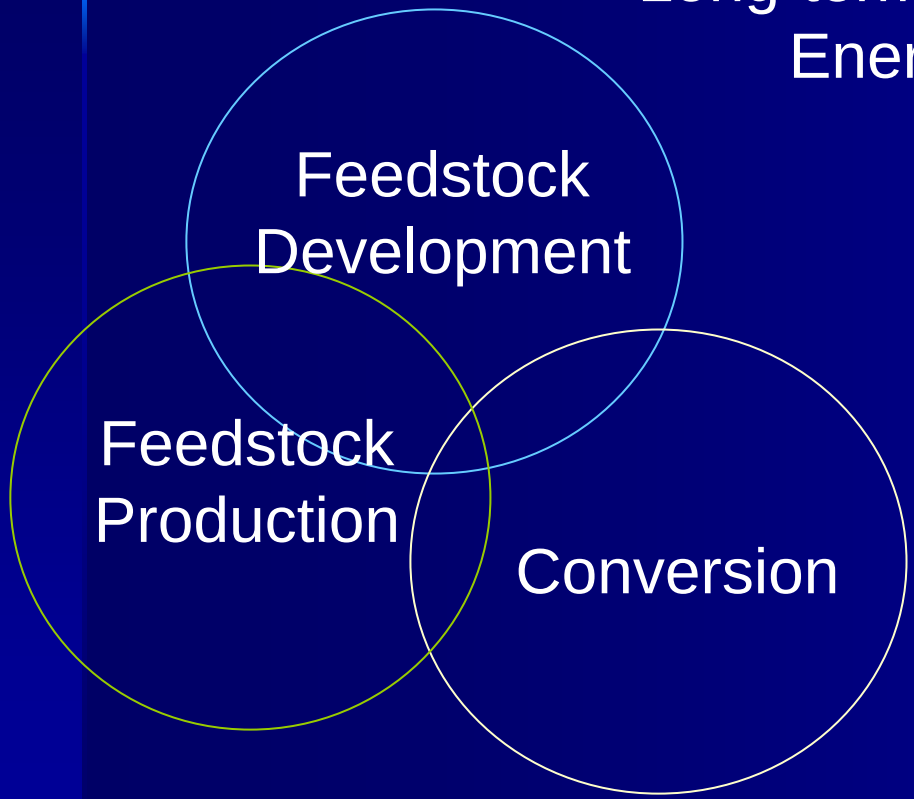
Long-term Diversified Portfolio for Energy Self-sufficiency



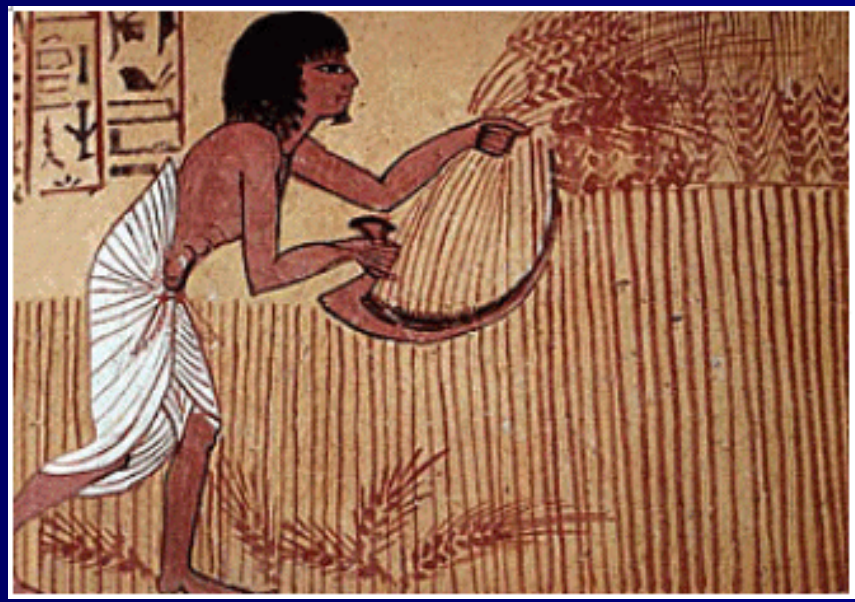
The three components for biobased energy production need to be considered as an integrated whole.

ARS Feedstock Development Research

Contributes to USDA Energy Science and Education Strategic Plan

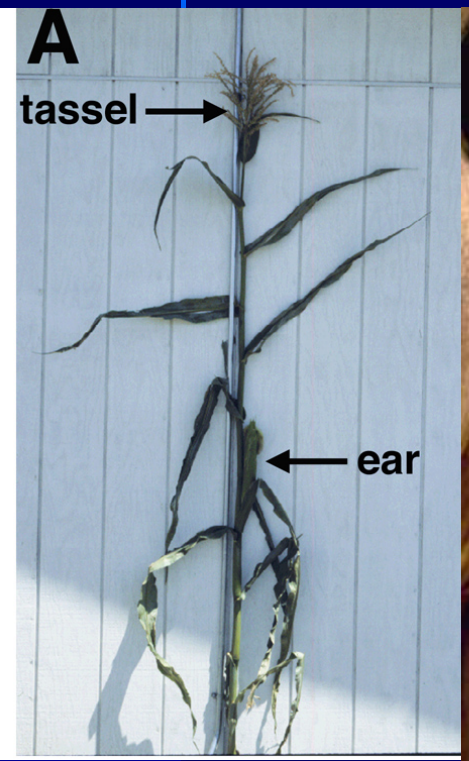
To lead the production and efficient use of agriculture-based energy

Goal 1: High quality, cost effective, cellulosic feedstocks are produced



Wheat was domesticated around 10,000 years ago

Evolution of maize from wild ancestor, teosinte



maize

teosinte

Feedstock Development Challenge

Rapid development of feedstocks is difficult because of their complex genetic structure

Feedstock Development

Problem Area 1: Need to use model plant systems and applied genomics to accelerate the development of cost-effective feedstocks

- Gene discovery
- Assist in identifying genetic markers and mapping
- Provide genetic resources and bioinformatics tools

Examples of Model Systems

sorghum

Brachypodium

Feedstock Development

Problem Area 2: Timely trait/allele identification and screening are needed to accelerate development of feedstock varieties

- Phenotyping and genotyping
- High throughput screens – metagenomics, biochemical screens, spectral characteristics
- Develop genetics, genomic, and statistical approaches for dissecting complex energy traits

Feedstock Development

Problem Area 3: Enhanced feedstock germplasm is needed to produce bioenergy more efficiently

- Develop germplasm with improved bioenergy characteristics
- Develop new energy crop varieties

Feedstock Development Teamwork for Switch Grass Development

Genomics-Enabled Genetic Improvement