



For a bioenergy economy to positively impact the United States, we must address complex issues in agricultural, industrial, environmental and behavioral systems. Within this area, the GLBRC will take a holistic approach to evaluating the economic and environmental sustainability of transforming biomass to biofuel.

Leading this area of GLBRC research is G. Philip Robertson, a professor of crop and soil sciences at Michigan State University. As a crop and soil scientist and also an ecosystem ecologist, Robertson focuses much of his research on the role that agriculture plays in greenhouse gas dynamics, and he is internationally known for his expertise in this area. Robertson has been the director of the Long Term Ecological Research (LTER) at the Kellogg Biological Station in Hickory Corners, Mich., the only site in the national LTER network to focus on agriculture, for almost 20 years.

The overarching charge of the GLBRC's sustainability thrust is to improve sustainability of bioenergy practices. Researchers in this area will support the biomass-to-bioenergy pipeline by developing ecological, agricultural and life cycle practices that are economically viable and environmentally responsive.

GLBRC research will address bottlenecks in agricultural, industrial, & behavioral systems to improve:

- Carbon neutrality and net greenhouse gas mitigation across the entire biofuel life cycle
- Ecosystem services in biofuel landscapes (e.g. water quality, biodiversity, pest suppression)

GLBRC research will integrate ecological, agricultural & life cycle practices with:

- Improved plants (GLBRC Thrust 1)
- New processing (GLBRC Thrust 2)
- Improved conversion (GLBRC Thrust 3)

Sustainable Bioenergy Practices

Goal: Predict Behavior of Bioenergy Production Systems

High Input,
Low Diversity
(annuals)

➤ replicated plots in MI (KBS), WI
(Arlington) & established stands on
local farms

Continuous Corn

Corn-Soybean-Canola



Monoculture switchgrass
Switchgrass - Legumes



Poplars



Early successional
Native prairie



Low Input,
High Diversity
(perennials)