ABSTRACT

Agro-ecosystem Approach to Sustainable Biofuels Production via the Pyrolysis-Biochar Platform (AFRI-CAP)

Kenneth Moore

Iowa State University of Science and Technology

Led by Iowa State University, a network of nine institutions will address the Sustainable Bioenergy USDA Program Area Priority.

The North Central US is one of the most agriculturally productive areas in the world. However, intensive crop production on land within this region that is not well-suited to row crop production has impaired soil and water quality and led to loss of productivity. Growing dedicated biomass crops on land that is unsuitable or marginal for row crop production would mitigate these problems and provide additional ecosystem services.

This program will focus on herbaceous perennials that provide potentially high biomass production and ecosystem services. A regional system for producing fuels from these biofeedstocks based on pyrolytic conversion will be evaluated. Objectives are to: 1) develop cultivars and hybrids of perennial grasses optimized for bioenergy production, 2) develop sustainable production systems that optimize perennial biomass yields and ecosystem services, 3) develop flexible, efficient, and sustainable logistics systems, 4) identify and characterize sustainable bioenergy systems to achieve social, economic, and environmental goals and understand socioeconomic and environmental consequences of perennial bioenergy systems, 5) identify germplasm characteristics amenable to pyrolytic conversion and evaluate performance of pyrolytic biofuels, 6) evaluate policy, market, and contract mechanisms to facilitate broad adoption by farmers, 7) develop procedures for managing risks and protecting health for each component of the biofuel production chain, 8) provide interdisciplinary education and engagement opportunities for undergraduate and graduate students, and 9) develop outreach programs for all stakeholders of the bioenergy system.

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