

# Filling the Cellulosic Bio-Economy Gap by Utilizing a Wedge Approach Combined with Stakeholder Collaboration

## Background/Objective

Bioenergy grasses are a promising potential feedstock for low-carbon biofuels. Despite existing policies and subsidies, the price gap between market and breakeven prices of cellulosic biomass for farmers represents a significant barrier to the development of a cellulosic bioeconomy. This work uses an agent-based model to assess the impact of combinations of possible technologies and policies on bioeconomy development.

## Approach

Researchers used a bottom-up agent-based modeling tool to replicate the behaviors and interactions of key stakeholders including biomass producers (farmers), refinery industries, rural communities, and government agencies, and analyze the emergence of a local-scale cellulosic bioeconomy by incorporating an integrated portfolio of multiple policy options. The role of collaboration among the stakeholders was assessed for impact on the price gap between the market and breakeven prices of cellulosic biomass. They evaluated the Sangamon River Basin as a case study site.

## Results

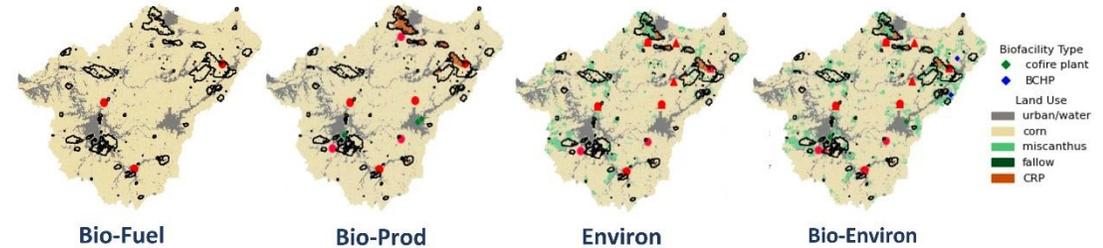
Active collaboration among stakeholders increased the effectiveness of bioeconomy policies. Inclusion of carbon credits and environmental value in the policy portfolio can bridge the price gap through collective contributions from diverse stakeholders where the cellulosic biofuel and bioproduct industry plays a key role.

## Significance/Impacts

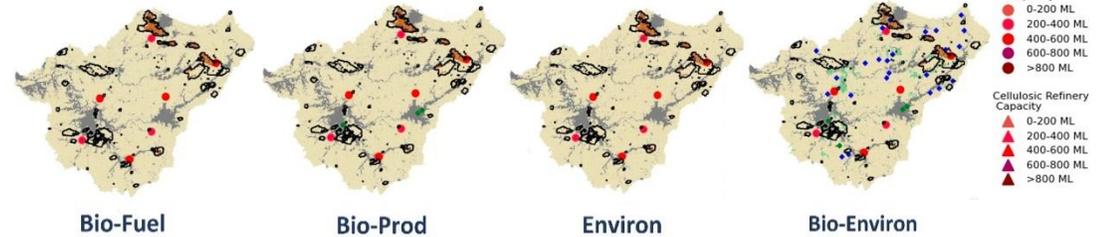
This work suggests that the emergence of a local cellulosic bioeconomy may be achieved through an integrated approach catalyzed by stakeholder synergy and supports economic policy which emphasizes mechanisms fostering stakeholder synergy alongside consistent long-term policy commitments.

Yang and Cai. 2026. "Filling the Cellulosic Bio-Economy Gap by Utilizing a Wedge Approach Combined with Stakeholder Collaboration" *Renewable Energy*. DOI: 10.1016/j.renene.2026.125419.

### With stakeholder collaboration



### If without stakeholder collaboration



**Effects of various policy portfolios on watershed energy grass adoption and biorefinery investment decisions, simulated by models developed with and without stakeholder collaboration.**