

Background/objective

Successful bioenergy policy implementation relies on wide adoption of perennial energy crops at the farm scale, but there is limited understanding of the complex factors that interact to influence farmers' land-use decisions. To better understand these causal relationships and associated behavioral heterogeneities, researchers used survey data of U.S. Midwestern farmers to develop a Bayesian network (BN) model.

Approach

- ❖ Used survey responses from 242 Midwestern farmers regarding perennial bioenergy crop adoption decision preferences.
- ❖ Constructed a BN model to delineate causal relationships between farmer adoption decisions and influencing factors.
- ❖ Classified farmers into four categories based on attitudes toward economic, social, and environmental dimensions.

Results

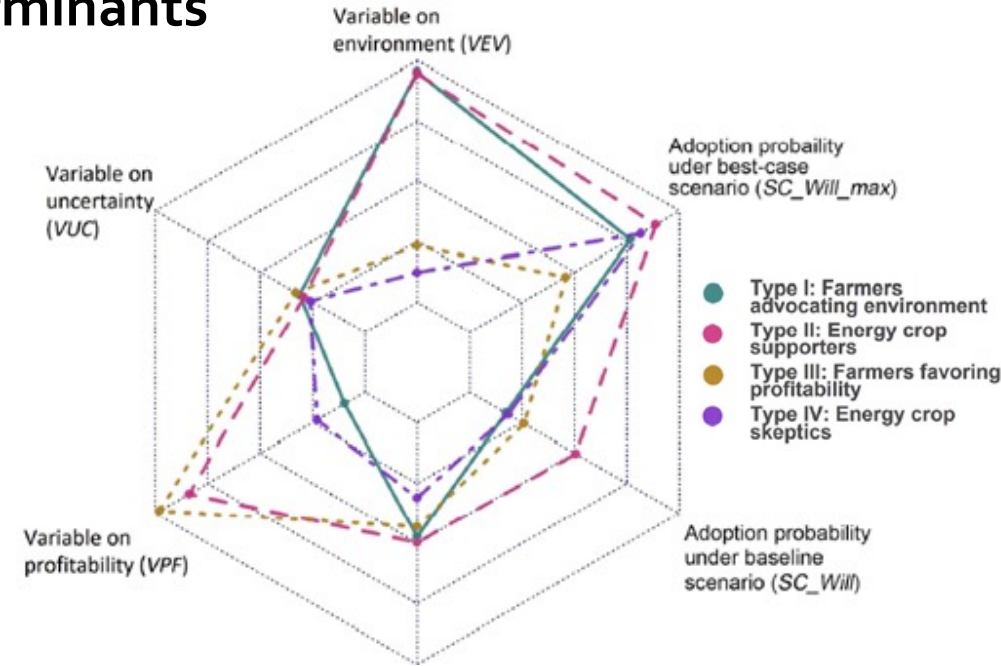
- ❖ Economic factors had a dominant role in the BN, while environmental and social factors also played a non-negligible role.
- ❖ Four farmer types had statistically significant between-group differences in sensitivity to incentives.
- ❖ Adoption willingness of “energy crop skeptics” and “farmers advocating environment” increases more with increasing profitability than other groups. In contrast, among the four groups, “energy crop supporters” and “farmers favoring profitability” react more positively to the enhanced belief in environmental benefits of perennial grass.

Significance

This study has implications for policy design intended to increase perennial energy crop adoption. Specific recommendations include development of local markets and educational programs that increase farmer understanding of perennial energy crops. Further, policies should be developed targeting the four farmer types.

Yang et al. 2021. "Adoption of Perennial Energy Crops in the U.S. Midwest: Causal and Heterogeneous Determinants." *Biomass and Bioenergy*. DOI:10.1016/j.biombioe.2021.106275.

Adoption of Perennial Energy Crops in the U.S. Midwest: Causal and Heterogeneous Determinants



Radar plot of four farmer types identified. Points farther from the center indicate more positive attitude toward an aspect of perennial energy crop or greater likelihood of adoption under a given scenario.