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16. Abstract

Investment risk and uncertainty about the availability of biomass feedstock hinders the development of a mature cellulosic biofuel sector. The Biomass Crop Assistance Program (BCAP) is a federal program designed to subsidize farmers to establish, produce and deliver biomass feedstock to biorefineries. This study evaluated the impacts of BCAP on the optimal biofuel supply chain decisions considering feedstock yield uncertainty and associated investment risk given diverse risk preferences of the biofuel sector. The expected cost for a risk-neutral biofuel sector was minimized using a two-stage stochastic mixed integer linear program, whereas the Conditional Value-at-Risk of the supply chain was optimized for a risk-averse sector. Ex-ante analysis of a switchgrass-based biofuel sector in west Tennessee indicates BCAP payments could lower expected cost and investment risk for both risk-averse and risk-neutral biofuel sectors. However, the cost saving and risk reduction resulting from BCAP incentives for the risk-averse biofuel sector were higher than the risk-neutral biofuel sector. In addition, BCAP payments may drive more cropland to be converted for switchgrass, which potentially mitigates water-induced soil erosion and reduces greenhouse gas emissions associated with net carbon sequestration, but may also create unintended consequence of competition for land between food and fuel use.

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