

Land owners' motivation for supply of energy crops:

Barriers, spatial heterogeneity, and neighbour effects

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The formation of land use patterns is mostly driven by individual decision making of the land owners, motivated by their private objective. Land use is however also important for social objectives such as the provision of water quality downstream, GHG emissions and other environmental outcomes. Identification of the drivers of land use change is therefore an important task for efficient policy design. Energy crops have been shown to contribute to water quality improvements among other environmental benefits, while maintaining a positive profit for the land owner. The purpose for this study is to identify land owners' motivation for conversion to energy crops.

Energy crops are not necessarily adopted, even when the returns are competitive to traditional crops, which suggests the existence of barriers to adoption of energy crops: lost option value due to long-term commitment of land; high start-up costs; and uncertainties of price, production and future markets. We use the development of land use in Denmark from 2006 to 2013 to identify incentive mechanisms and potential barriers to the supply of energy crops. As we are only able to observe the share of land devoted to energy crops for farms that have chosen to undertake energy crop production, we approach the problem as a sample selection problem and employ the Heckit procedure. We use spatially specific data on land quality and rainfall, and we deduct the coordinates of the land owners to assess the presence of spatial autocorrelation, i.e. a spillover effect from neighbours who have already adopted energy crops.

The results indicate that both farm size and neighbours growing energy crops increase the probability of converting a share of land to energy crops. For the land owners that allocate a part of their land to energy crops, variables like land quality and farm size influence the share of land devoted to energy crops. This suggests that economies of scale are an important consideration when adopting energy crops. Furthermore,

the results suggest that facilitating local agreements between farmers to coordinate biomass supply, may potentially be an effective way to encourage bioenergy production.