



The impacts of land-use change from grassland to bioenergy Short Rotation Coppice (SRC) Willow on the crop and ecosystem greenhouse gas balance

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The aim of this research is to better understand the greenhouse gas balance of land-use transition to bioenergy cropping systems in a UK context. Given limited land availability, addressing the food-energy-water nexus remains a challenge, and it is imperative that bioenergy crops are sited appropriately and that competition with food crops is minimized.

Here we present the results of a years' worth of soil and GHG data for a conversion from ex-set aside grassland to short rotation coppice (SRC) willow for bioenergy on a commercial scale.

Initial results indicate that willow was a net sink for CO₂ in comparison to grassland which was a net source of CO₂. This provides evidence that the GHG balance of transitions to SRC bioenergy crops will potentially result in increased soil carbon. The empirical findings from this study have been combined with modelled estimates for the site to both test and validate the ECOSSE model. Initial comparisons show that the model is able to accurately predict the respiration occurring at the field site, suggesting that it is a valuable approach for up-scaling from point sites such as this to wider geographical areas and for considering future climate scenarios. The modelling output will also provide a user-friendly tool for land owners which will determine the GHG and soil carbon effects of changing land to bioenergy for UK.

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