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## Climate Regulating Service – A Spatial Analysis Assessing the Effectiveness and Economic Efficiency of Ecosystem Service Based Management

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### ABSTRACT

Soil organic carbon (SOC) and carbon stored in biomass (BIOC) play a crucial role in the regulation of the global carbon cycle and its feedbacks within the Earth system. Compelling evidence exists that soil carbon stocks have been reduced in many regions of the world, with these reductions often associated with agriculture. In a Danish context research also suggests that carbon stocks are declining. The scope of Payment Ecosystem Service Approaches to effectively and efficiently address climate regulation will depend on the spatial distribution of the carbon assimilation capacity, current land use, the value of avoided emissions and land owners objectives and preferences in terms of participating in initiatives to increase SOC and BIOC. The spatial analysis of these factors is conducted at the Danish national scale. We map the carbon sequestration potential under different land use scenarios, value the potential avoided emissions in terms of their marginal abatement costs and compare these to an assessment of costs of achieving these potentials using voluntary agreements with agricultural land managers.