



## Effects of bioenergy production on European nature conservation options

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To increase security of energy supply and reduce greenhouse gas (GHG) emissions the European Commission set out a long-term strategy for renewable energy in the European Union (EU). Bioenergy from forestry and agriculture plays a key role for both. Since the last decade a significant increase of biomass energy plantations has been observed in Europe. Concurrently, the EU agreed to halt the loss of biodiversity within its member states. One measure is the Natura2000 network of important nature sites that actually covers about 20% of the EU land surface. However, to fulfil the biodiversity target more nature conservation and restoration sites need to be designated. There are arising concerns that an increased cultivation of bioenergy crops will decrease the land available for nature reserves and for “traditional” agriculture and forestry. In the following the economic and ecological impacts of structural land use changes are demonstrated by two examples.

First, a case study of land use changes on the Eiderstedt peninsula in Schleswig-Holstein/Germany evaluates the impacts of grassland conversion into bioenergy plantations under consideration of selected meadow birds. Scenarios indicate not only a quantitative loss of habitats but also a reduction of habitat quality.

The second study assesses the role of bioenergy production in light of possible negative impacts on potential wetland conservation sites in Europe. By coupling the spatial wetland distribution model “SWEDI” (cf. SCHLEUPNER 2007) to the European Forest and Agricultural Sector Optimization Model (EUFASOM; cf. SCHNEIDER ET AL. 2008) economic and environmental aspects of land use are evaluated simultaneously. This way the costs and benefits of the appropriate measures and its consequences for agriculture and forestry are investigated. One aim is to find the socially optimal balance between alternative wetland uses by integrating biological benefits – in this case wetlands - and economic opportunities – here agriculture and forestry including bioenergy options.

Results reveal that bioenergy targets have significant effects on conservation planning and nature conservation. The additional land utilization demands driven by bioenergy targets influence not only the restoration costs of wetland areas. Also wetland conservation targets in one place stimulate land use intensification elsewhere due to market linkages. It also implies that environmental stresses (to wetlands) may be transferred to other countries. In all the results show that an integrated modelling of environmental and land use changes in European scale is able to estimate the impacts of policy decisions in nature conservation and agriculture.

As shown by the case study, the implementation of any targets concerning resource utilization need to be followed by adequate land use planning.

### References

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