

The effects of short rotation coppice on the visual landscape: an investigation for different landscape types in the Hamburg Metropolitan Region

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Abstract

In the context of climate change adaptation and mitigation measures the 'energy turnaround' (Energiewende) in Germany is causing landscapes to change rapidly. Agrarian landscapes are changing due to the cultivation of bioenergy crops and may even change more rapidly in the future if bioenergy plants like maize are replaced by even taller short rotation coppice plantations (SRC) of willow and poplar. An increasing cultivation of short rotation coppice will have consequences on the visual landscape especially in open landscapes, because the coppices can grow as high as ten meters before they are harvested. Conflicts are expected in regions where income by tourists and recreationists plays an important role in the local economy.

This study deals with possible visual effects of short rotation coppice on the landscape. We investigated if the cultivation of SRC has different impacts in different landscape types and which percentages of SRC in the landscape are best suited for different landscape types.

The study was carried out for landscapes in the Heidekreis district in northern Germany, which is part of the Hamburg Metropolitan Region. This district has 100 ha of SRC, the highest amount in Lower Saxony. Short rotation coppices were visualized for three typical landscape types of the region, namely a landscape rich in meadows in a floodplain of a river, a small-structured agrarian landscape and an agrarian landscape with low structural diversity.

Visualizations were generated for different scale levels from the street-level perspective to bird's-eye view. Photomontages of landscapes with and without SRC were visualized for street-level perspective using the software Photoshop. Similar amounts of SRC were implemented into status-quo photographs taking into account the respective landscape structure. The visualizations of different percentages of SRC in the landscape (20%, 50%

and 100% SRC) were generated for bird's-eye perspective with the GIS-based software CommunityViz.

The visualizations were used in an online-survey to gather quantitative data about people's reactions towards the visual effects of SRC (n = 295). The results show that SRC can have both positive and negative effects on the visual landscape depending on the landscape type and the amount of SRC in the landscape. Landscapes with a high scenic value like landscapes rich in meadows seem to be more sensitive to the introduction of SRC. Whereas, low scenic value agrarian landscapes are enhanced by the introduction of SRC (see Fig.1). However, high amounts of SRC (50% or more SRC) decrease the scenic value of all landscape types whereas 20% coverage increased the scenic value in agrarian landscapes and reduced the scenic value in landscapes rich in meadows.

The profession of the respondents affected their assessment. People who do not deal with the environment in their professional life were more moderate about landscape changes, people dealing with the environment used stronger positive and negative assessments to differentiate between landscape changes and landscape types. Furthermore, it was found that SRC plantations can easily be improved by measures along the edge. Respondents preferred SRC with a flower margin and with hedge shrubs along the edge. The cultivation of SRC in stripes was ranked significantly more positive compared to the standard cultivation in blocks.

The results can help politicians and planners to improve the acceptance of growing biomass crops as sensitive areas and the maximum amount of SRC can be considered. Funding mechanisms of the EU agriculture policy could be adapted taking into account the visual implications of different land uses.

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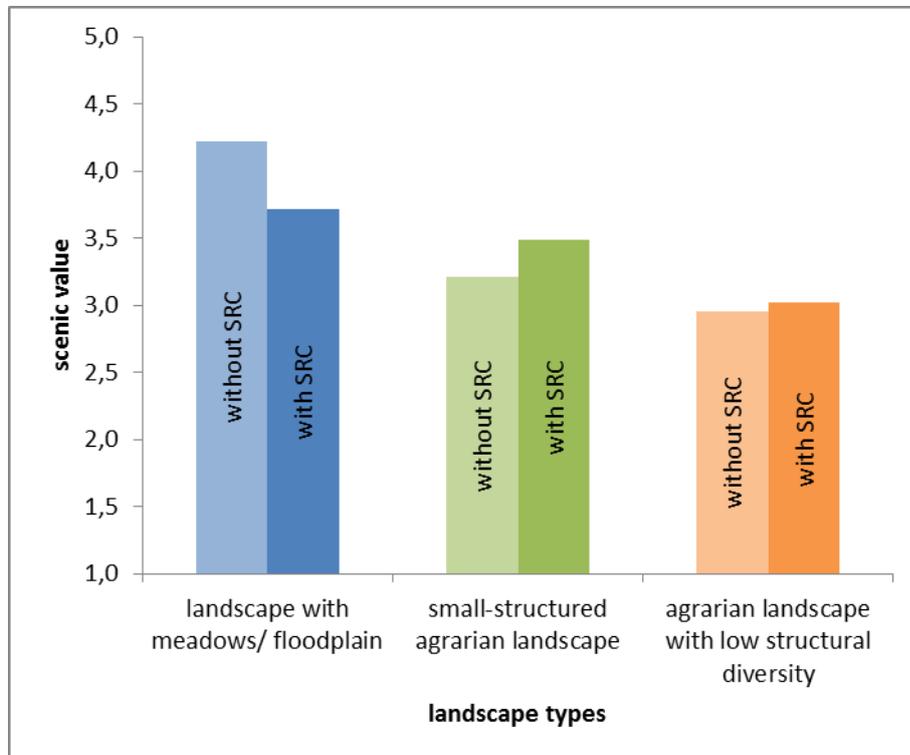


Fig 1: Mean assessment of landscapes with and without short rotation coppice (SRC) on a 5-point Likert scale (from 1 = very poor to 5 = very good; n = 295)