

# **Optimization of the stand level management taking account climate benefits of the harvested wood products**

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In this study management of the pine is optimized at the stand level taking into consideration simultaneously climate benefits of using wood products instead of fossil carbon intensive products and fossil fuels, carbon sequestration of the standing stock as well as harvesting revenues.

Forest growth is predicted using process based growth model PipeQual. Using branch and growth predictions from the growth model as an input, proportions of different sawn wood grades and by products of harvested stems are predicted with models developed in the previous study. Combining the predictions of sawn wood grade proportions to the information of the end uses of different sawn wood grades and average life cycle lengths of the products, carbon storage of the harvested wood products can be incorporated to stand level analysis. We also investigate the effect of both material and substitution effects of end products to study if taking account reductions of the CO<sub>2</sub> emissions due to decrease in use of wood material or biofuels instead of more carbon intensive products would affect to the optimal forest management compared to cases where only timber management or/and carbon storage is taken into consideration. Also soil carbon is included to analysis. End product distribution models allow us to study the effects of forest management to the quality of wood material and further, the use of wood material. Sensitivity analysis is made for substitution factors, carbon price as well as interest rate used to discount both net revenues from harvests and CO<sub>2</sub> emission reduction benefits.

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