



## **Modelling the consequences of increased use of forest harvest residues for bioenergy production**

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The increased energy production from wood products as an alternative to fossil fuel combustion is a demand in countries such as Norway. The Norwegian government plans to double the production of bioenergy to 28 TWh per year within 2020. To achieve this, harvest residues such as needles, twigs and branches in addition to stems (whole tree harvest, WTH), have to be utilized to a greater extent than today's practice. However, WTH may remove nutrients from the system. The ecological impact of this removal, and the consequences of WTH as opposed to Conventional Harvesting (CH) in forest ecosystems in general, are the topics of an ongoing research project. We report on our approach to model the system behaviour under WTH, trying to identify key factors driving soil organic matter, nutrients, biomass, biodiversity of ground vegetation and others. Simulations will show the effect of WTH on the carbon and nitrogen budget in particular. The approach comprises statistical and time series analysis and process-oriented models, using data from field trials and long-term forest monitoring. New research sites comparing WTH, CH and control plots for two climatically very different locations in Norway were also established. The project has the aim to give recommendations for appropriate strategies, such as the percentage of residues that should be left in the system, and suitable regions (in Norway) where WTH may be sustainably performed.