

DECISION SUPPORT MODELS FOR INCREASED HARVEST AND CLIMATE-MOTIVATED FOREST POLICIES

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Background

In Norway, the current carbon sink of the Land Use Land Use Change and Forestry (LULUCF) sector is about 40% of the national carbon emissions. The net carbon uptake is expected to remain high but the future forest carbon sequestration will be affected by both forest management and climate change. It is a political goal to reduce the annual carbon emission by 15-17 million tonnes CO₂ by 2020. The forestry sector is expected to contribute through increased extraction of biomass for bioenergy, extended use of wood in construction and as replacement for energy-demanding products, altered management practices that increase annual increment, and sequestering of atmospheric carbon in the forest area.

Recently, the National Forest Inventory data has been used together with a modified version of a forestry planning tool (Avvirk2000) and a soil carbon model (Yasso) to produce carbon budget scenarios for Norway. These scenarios have generated a vigorous and continuing public debate concerning the role of forests in Norway's climate policy and optimal harvest level in Norwegian forests. A key issue has been the actual effect on carbon emissions and trade-offs between a forest carbon stock and increased harvest to facilitate increased substitution of fossil fuels and energy-demanding products.

A new climate scenario project

In 2011 a new climate scenario project (duration 2011-2014) is launched to address the following question: what are the effects of increased harvest (up to 50 % increase) upon carbon sequestration, biomass output for bio-energy and other uses, biodiversity and economy. The project is carried out by an interdisciplinary research consortium with a strong end-user group from environmental and forestry governmental institutions as well as the private forestry sector.

The primary objective is to develop a new forest carbon modelling framework and make integrated scenarios for carbon sequestration under different harvest levels plus effects on economics, biodiversity and geophysical climate impact. More specifically, the project will:

- 1) develop a new and flexible modelling framework for national scenario analysis
- 2) make updated growth and mortality functions
- 3) develop new functions to predict heartrot in live trees
- 4) parameterize the soil carbon model Yasso 07 for Norwegian conditions
- 5) analyse effects of silvicultural treatments on carbon dynamics
- 6) analyse biodiversity effects of different harvest levels
- 7) analyse economic impact of different harvest levels
- 8) arrange workshops to establish scenarios of interest for intended end-users
- 9) make short term- (20 years) and long-term (100+ years) scenarios under different forest management regimes (harvest level) and
- 10) evaluate global, long-term climate impacts (geochemical, geophysical) of different harvest levels.

The project aims to create a common understanding of trade-offs related to increased forest biomass extraction and it shall improve the knowledge basis for sustainable forest policies and resource management as well as strengthen the relationship between industry, government agencies and research institutions.