

# VULNERABILITY ASSESSMENT OF ECOSYSTEM SERVICES FOR CLIMATE CHANGE IMPACTS & ADAPTATION

LTSER NETWORK, FINLAND



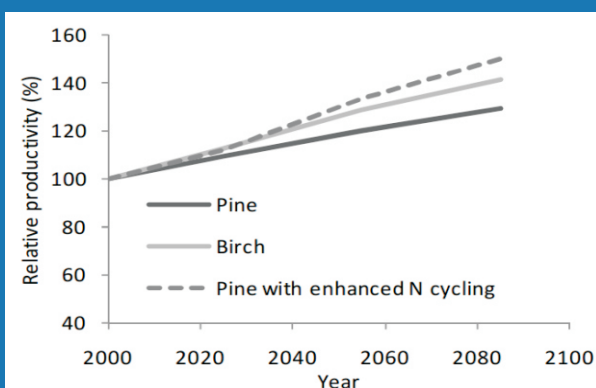
Climate change is predicted to impact the growing conditions of boreal forests this century, i.e. within the lifetime of currently established new tree stands. Significant climate changes may challenge the currently established best practices in silviculture, making forest owners' decisions concerning forest regeneration very difficult. The EU LIFE+ VACCIA project (2009–2011), has been organized along 13 Actions, which provided the general public, commercial enterprises and decision makers of LTSER platforms with literary and internet-based information, seminars and future prediction workshops on adaptation to climate and ecosystem changes. Within these, VACCIA combined biologically based forest productivity models with economical optimisation to study the best silvicultural practises under changing climate.

## RESEARCH

The estimated average growth increment in closed-canopy pine stands with a CO<sub>2</sub> and temperature rise scenario of 2°C per year 2100 was 16% & 31% in southern Finland and in Lapland, respectively. The extreme scenario of a 5°C temperature rise resulted in a 40% growth enhancement of in southern Finland and 80% in the north. Although tree growth is enhanced at the single stand level, at the regional level, forest productivity is still very much influenced by the current forest structure and the bigger differences start to show during the later half of this century.

The long rotation times in forest management require starting adaptive measures well ahead of the expected climatic change. In practise, adaptation can be very slow. Many forest owners and professionals place more trust in observed growth than in theoretical predictions. This needs to be considered when disseminating climate change predictions. Embedding the climate change option in management planning tools would make climate change impacts understandable concepts. This in turn would greatly speed up dissemination of climate change information among professionals in local forest owners' associations as well as among forest owners.

Predicted relative (year 2000 = 100) annual photosynthetic production in middle-aged pine and birch stands, to the year 2085. Only the direct effect of temperature and CO<sub>2</sub> is considered. Predicted stemwood production of pine is also shown, taking into account enhanced N cycling and changed allocation patterns.



The simulations were done with CO<sub>2</sub> scenario A1B and linear temperature rise of 3°C by year 2100 Nikinmaa et al. (2011: Regional predictions of forest structure).

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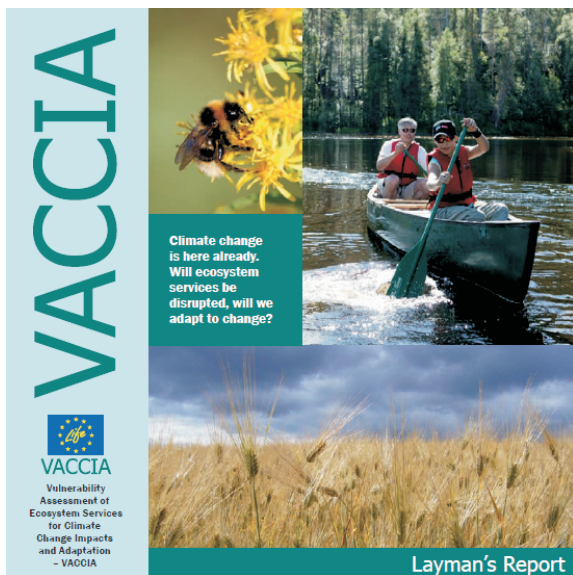
## AIMS

- To clarify how climate change will influence forest productivity & management conditions, & how that will influence the productivity & profitability of different silvicultural schemes.
- To communicate the results in common seminars with forestry organisations and NGO's both at local community & at national level. We aimed at getting feedback on adopting different adaptive measures under an uncertain future & discussing how the change is likely to influence forest owners' incomes.

## OUTCOME - IMPACT

The study influences management choices:

- The net present value of the final harvest could more than double in South Finland and triple in the north but the more vigorous ground vegetation growth makes forest regeneration more difficult and costly.
- With changing climate, silviculture could become more profitable in Lapland and conflicts between land uses could increase, particularly as the share of protected areas of the total land area is high.
- Climate change facilitates the use of more varied silvicultural chains. These should be considered already when making present species selections.



## PRIORITY THEMES



**OTHER?**

## PRIORITY ECOSYSTEM SERVICES

### PROVISIONING

RAW MATERIALS, ECONOMIC VALUE, CLIMATE  
MITIGATION

### REGULATING

### CULTURAL

### SUPPORTING

## AREA OF RELEVANCE, ACCORDING TO SDG



**SDG - UN SUSTAINABLE DEVELOPMENT GOALS**

## FURTHER INFORMATION

Web link: [http://www.syke.fi/en-](http://www.syke.fi/en-US/Research_Development/Research_and_development_projects/Projects/Vulnerability_Assessment_of_ecosystem_services_f)

[US/Research\\_Development/Research\\_and\\_development\\_projects/Projects/Vulnerability\\_Assessment\\_of\\_ecosystem\\_services\\_f](http://www.syke.fi/en-US/Research_Development/Research_and_development_projects/Projects/Vulnerability_Assessment_of_ecosystem_services_f)  
or [Climate\\_Change\\_Impacts\\_and\\_Adaptation\\_VACCIA/Reports\\_and\\_Publications\\_of\\_the\\_VACCIA\\_project/Reports\\_and\\_Publicatio](http://www.syke.fi/en-US/Research_Development/Research_and_development_projects/Projects/Vulnerability_Assessment_of_ecosystem_services_f)  
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