ALTERFOR

Deliverable 3.3 – Proceedings from open workshop

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Abbreviations used

CSA – Case Study Area
DSS – Decision Support System
ES – Ecosystem services
EU – European Union
FMMs – Forest Management Models
IIASA – International Institute for Applied System Analysis
LCCs – Local Case study Coordinators

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1 Introduction

European forests are expected to provide a broad range of ecosystem services (ES). This capacity is however threatened by the uncertainties of climate change, the complex dynamics of evolving global markets and the pressures for increased use of bioenergy. ALTERFOR's goal is to facilitate the implementation of FMMs better suited to meeting these challenges.

The work in ALTERFOR is based on case study areas (CSAs) in nine European countries (from North to South: Sweden, Lithuania, Ireland, Netherlands, Germany, Slovakia, Italy, Portugal, Turkey). Except Germany, which hosts two case study areas, there is one case study per country, resulting in a total of ten CSAs (Figure 1). These CSAs are forest landscapes covering sizes between several thousand up to several hundred thousands of hectares. They were selected as being representative for important problems at the interface of forest management and forest policy. Usually, the case studies' significance is not restricted to the country they are located in but extends to comparable situations in their whole respective climate zone. E.g. the Irish case study can serve as an example for vast peatland areas throughout the Northern part of Europe.

Figure 1 ALTERFOR involves 10 case studies in 9 European countries throughout Europe: Germany, Italy, Ireland, Lithuania, The Netherlands, Portugal, Slovakia, Sweden, and Turkey (figure source: Fraunhofer IMW, Schutterstock).

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In ALTERFOR each country used its own decision support system (DSS) / forest simulation model. On the one hand, this has the advantage that the projections were done with the best possible applicability for the specific case study conditions. On the other hand, this diversity in applied methods meant that the overarching global frame scenarios prepared by the International Institute for Applied Systems Analysis (IIASA) containing climate and timber demand scenarios could not be incorporated in the same way and to the same extent in all case studies. In brief, the three global frame scenarios are:

- Reference scenario – Within the first decades of the scenario, forest harvests are both driven by the increasing demand for bioenergy and the foreseen increasing demand for woody materials. The climate change is slightly halted through additional policies on greenhouse gas emission mitigation and some development of carbon capture technologies. The global temperature will be about 3.7 degrees Celsius higher by 2100 than the pre-industrial level (IPCC climate scenario RCP8.5).
- EU Bioenergy scenario – In this scenario, the emission reduction targets in the EU for 2030 and 2050 are assumed to be fulfilled. The biomass demand for energy is assumed to remain stable thereafter in the EU. Instead the importance of woody biomass as a feedstock for material production increasing. Outside the EU, it is assumed that additional climate change mitigation policies are in effect, so that the global temperature will be ca. 2.5 degrees Celsius higher by 2100 than the pre-industrial level (IPCC climate scenario RCP4.5).
- Global Bioenergy scenario – The climate policy is strict and together with alternative energy sources and strong development of carbon capture technologies leads to reaching the climate targets. On the forest sector, the high efforts in climate change mitigation are seen as an increase in the harvest levels. The resulting temperature increase is in the range of 1.5 to 2.0 degrees Celsius by 2100, compared to pre-industrial level (IPCC climate scenario RCP2.6)

In order to partly overcome methodological differences resulting from applying different projection tools and different ways of incorporating the global frame scenarios, ALTERFOR at an early stage defined a standard set of output variables as a common requirement to be provided by all case studies (Nordström et al., 2018, under revision).

The ALTERFOR Milestone 11 (see https://www.alterfor-project.eu/deliverables-and-milestones.html), projections with current forest management models (FMM) per case study consists of a compilation of DSS results for Current FMMs under the three global frame scenarios - Reference, EU Bioenergy and Global Bioenergy. Based on the projections in Milestone 11, the local case study coordinators (LCCs) produced assessments of the six ecosystem services (ESs) included in ALTERFOR (biodiversity conservation, timber production, carbon sequestration, regulatory services, cultural services and water-related services) and timber for their CSAs. The LCCs were facilitated in this by example ES assessments from the ALTERFOR Ecosystem Service Expert Group. The ES Experts used these case study based assessments to produced synthesis reports for all ESs, bringing together the most important results and trends from the CSA reports.

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2 The Prague workshop

In order to discuss central concepts and assumptions of the ALTERFOR simulation approach, WP3 arranged a workshop open to an international professional audience. The IUFRO conference "Landscape Management: From Data to Decision", held from September 17-19 in Prague, offered an ideal framework. On Tuesday, September 18, the workshop was embedded in the conference in the shape of three sessions dedicated to ALTERFOR with altogether nine presentations. In line with the most important modelling issues in the project, the topics of the sessions were:

Session 1: Methods for forest owner modelling and ecosystem service valuation
Session 2: Policy relevance
Session 3: Reliability of scenario implementation

In the following text we include, grouped by sessions, the slides of all presentations and summaries of each session's discussion. After that, we give an overview of what has been learned from the workshop.

2.1 Methods for forest owner modelling and ecosystem service valuation

The main point of the first session was to discuss if ALTERFOR does take into account the values and preferences of forest owners and other stakeholders in an adequate way. Three presentations were held from the perspective of different countries/case study areas (CSA):

Assessing forest ecosystem service provision with Fuzzy Logic Methods
Peter Biber, Technical University of Munich, Germany

An approach to develop robust landscape-level forest management models in the Vale Sousa, Northwest Portugal
José C. Borges, Lisbon University, Portugal, presented per pro. by Ljusk Ola Eriksson

A microsimulation approach to long term landscape simulation in a fragmented landscape
Isak Lodin, Ljusk Ola Eriksson, Swedish University of Agricultural Sciences

The discussion in session 1 - *methods for forest owner modelling and ecosystem service valuation* - brought up the following topics:

- Cross-case study comparisons of ecosystem service evaluations were discussed as an important issue, especially when it comes to a synopsis and upscaling of the ALTERFOR outcomes. Such comparisons should take into account that absolute and relative assessment might be different. E.g. in different European regions very different levels of species abundance might be considered "high". In this context, a participant suggested it might be worth including not only species diversity but also functional diversity in biodiversity assessments.
- Transparency of the evaluation concepts to stakeholders is an important aspect. Black box-approaches must be avoided, otherwise acceptance and relevance of the results in the political process may be in question. The transparency topic also led to the question what to do, when experts' opinions (to be implemented as rule systems for ecosystem service evaluation) about the determining factors of an ecosystem service differ. As a conclusion, in such

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cases the evaluation should include, compare and present the outcomes obtained with diverging concepts. This might, along the way, help to answer interesting questions about the perceived and real sensitivity of ecosystem service provision.

- The degree of detail to choose when distinguishing behavioural forest owner types was discussed as an interesting tradeoff between realism in detail and effort to spend. Five types, as considered in Sweden, seems a reasonable choice. An overarching owner classification for the whole ALTERFOR project would not make sense as conditions in the case studies differ too much.
- When discussing forest management alternatives with stakeholders and forest owners presenting the biophysical (im-) possibilities in advance is helpful for avoiding unrealistic expectations.

2.2 Policy relevance

The second session asked whether the ALTERFOR scenario outcomes would be sufficiently relevant for the design and change of policies. Three presentations were given:

Stand and landscape alternative management models for addressing new demands on forests by society
Giulia Corradini, University of Padova, Italy

Evolutionary multicriteria optimization – tool for improvement of integrated forest management in Central Europe
Róbert Sedmák, Technical University of Zvolen, Slovakia

Plugging scenarios for policy support in the Dutch forest policy landscape
Jim van Laar, Wageningen University, the Netherlands

The discussion in session 2 – *policy relevance* - brought up the following topics:

- All presenters were asked to elaborate to what extent ALTERFOR could make a difference in their case studies. This could be affirmed in all cases, despite the fact that forest policy and forest management are practiced and regulated very differently in the presented case studies. This underlines the central role of the ALTERFOR workshops in facilitating knowledge exchange between scientists and stakeholders, and in fostering interest.
- Especially the Italian and the Slovakian presentation triggered interest in the discussion about governance issues that are often more important for bringing about changes than silvicultural aspects, which are only a part of effective solutions. In the Italian example, this became evident by the broad public interest in the case study area. In combination with the existing controversies over governance, this signals that the research is highly relevant from a policy perspective.
- Discussion about the Slovakian approach to formally find optimal silvicultural treatment scenarios underlined the flexibility and usefulness of the approach but came also back to the governance issue. Given the existing practice that the majority of the decisions is made by a planning authority, the critical issue is to bring improved concepts into practice through a change of governance. The ALTERFOR workshops are considered a central feature in this context.

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- For the Netherlands, the ALTERFOR scenarios cover the whole country. Being communicated in the workshops, they might have an important policy effect: While the Dutch Action Plan Forest and Wood was ambitiously initiated in 2016, limited resources impede its implementation. The workshops should strive for creating enough attention and interest to push concrete actions for revitalizing the plan.

2.3 Reliability of scenario implementation

The third session was about the different ways climate and wood market information is implemented in the ALTERFOR DSS. This is a decisive issue, because it determines in how far the common ALTERFOR frame scenarios given by the IIASA are realistically covered by the projections on case study level. Three presentations were given:

Monitoring the amount of different wood types and price levels under different silvicultural approaches in the Gölcük planning unit
Uzay Karahalil, Karadeniz Technical University, Turkey

Implementing climate change and future timber prices in a forest management decision support system designed for management of Ireland's Western Peatland forests
Anders Lundholm, University College Dublin, Ireland

Assessing the influence of more adaptive forest management approaches on future delivery of ecosystem services in Lithuania
Gintautas Mozgeris, Aleksandras Stulginskis University, Lithuania, presented per pro. by Ljusk Ola Eriksson

The discussion in session 3 – *reliability of scenario implementation* - brought up the following topics:

- By formal optimising as done in Turkey and Ireland, it could be the case that growth and yield models are 'misused' by finding local peak values that do not properly represent the actual growth potential. Both Turkey and Ireland could show results that indicate their models are robust and resulting in realistic outputs.
- The implementation of climate change in Ireland is purely based on adjusting species growth. The question if other stand characteristics, such as mortality and tree shape might also be influenced was posed. The Irish team is confident that mortality is properly accounted for, but climate impact on other stand characteristics is not included.
- In the Turkish DSS, no specific models for tree species mixtures are included. Yield models for individual species are based on monospecific sample plots. In mixed stands, the first species present in the database is used to predict growth for the whole stand.
- In the Turkish frame scenarios, large price changes are present. The question was posed if the forest managers would accept that such changes can happen and change management accordingly? The Turkish team indicated that managers have their own expectations for price changes, but that they would take into account international developments and forecasts.
- The effect of the price changes in Ireland was discussed. The increasing prices result in larger harvest volumes, as harvesting becomes (more) profitable. However, when alternative

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FMMs are introduced, there is also a move on some site types towards low-intensity management (i.e. wide replanting spacings) to reduce the re-afforestation cost, leading to lower harvest volumes.

3 Lessons learned

The discussion revealed transparency and overarching comparability of ecosystem service evaluations as important points. While the former seems fully addressed in ALTERFOR, the latter remains a challenge for which, however, ideas and concepts are existing in the project. As an entirely positive message for ALTERFOR, there was no doubt about the project's potential to actually make a difference in the case studies. The stakeholder workshops in each CSA where alternative FMMs are developed and ecosystem services outcomes were discussed, were considered as indispensable for enabling new forest management principles to make an inroad into the national policy processes. Issues of governance, beyond the silvicultural core business were considered to be important in this context.

Pertaining to the reliability of climate and market scenario implementation, the general impression is that the DSS have been successfully upgraded to take account of changing market conditions and climate change effects on growth and yield. Still, much research would be needed to verify that the response to climate change is fully predicted.

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