FORMASAM - FORest MAnagement Scenarios for Adaptation and Mitigation
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Forest ecosystems are expected to play an important role to achieve ambitious climate change mitigation targets but at the same time also have to adapt to climate change. Process-based forest models allow for the assessment of future provisioning of forest products and services under different management and climate change scenarios. The aim of FORMASAM was to develop future forest management scenarios that follow a consistent framework from the stand across the landscape to the continental level, allowing to explore climate mitigation and adaptation options for the European bioeconomy. FORMASAM featured four Task Groups dedicated to designing future forest management scenarios (TG1) and operationalizing these for stand (TG2), landscape (TG3) and continental scale (TG4) models. FORMASAM has brought together modellers and forest management experts from all over Europe including eastern and south-eastern European experts facing very specific management challenges.

FORMASAM members have worked on achieving the project's objectives mostly during and in between four meetings:

1) A kick-off meeting with more than 40 of its members and associated members in Wageningen, NL from 12-14th of November 2018. Besides intriguing scientific keynote presentations from Marcus Lindner, Hans Verkerk and Annikki Mäkelä, representatives of UPM Kymmene and the Dutch State Forest Service gave excellent overview presentations of the challenges for Forest Management from the perspective of a global, multinational company and a country with little forest cover but many societal demands on forests. A highlight, both content-wise and networking-wise, was the joint field trip to a Marteloscope (Figure 1)
2) A second meeting in Grenoble, France from 26-29 of March 2019, during which the management scenarios were consolidated and the exact implementation in the forest models was further refined. This meeting also featured a keynote from Fulvio di Fulvio from IIASA, highlighting links of forest management and land-use modelling to the Shared Socioeconomic Pathways (SSPs). An excursion lead by practitioners from the French Forest Service (ONF) on forest management challenges in mountain forests was also perceived as a great success among the participants (Figure 1).
3) A third meeting in Zvolen, Slovakia from 17-20th of September 2019, during which the contribution to the UNECE Forest Sector Outlook Study (FSOS) was consolidated (TG1) and the model protocols for model comparisons and related model activities were drafted (TG2-4). An excursion and discussion with local forest managers, focusing on forest management challenges in Eastern European countries and Western Balkans (Figure 1) as well as a visit to the "Virtual cave", a showroom for digital forest management tools.
4) A final meeting in Potsdam, Germany from 3-6th of March 2020. The meeting was transformed into an Open Science conference together with the SUMFOREST projects REFORCE and FOREXCLIM (Figure 1). The conference was attended by around 100 scientists and representatives of NGOs, forest administration and forest companies and also featured a field trip to a typical pine forest in Brandenburg being converted to a mixed forest. The work of the different FORMASAM Task Group members were presented as regular oral contributions in the plenary of the conference and hence have been disseminated to a wide scientific audience.

Overall, the project has developed a first conceptual framework that allows to link socio-economically driven management challenges and climatically driven forest changes within the wider SSP-RCP framework. The framework is very extensive and the simulations of the stand, landscape and

continental scale models involved in FORMASAM could be integrated through this framework. The networking of FORMASAM has allowed the different modelling groups to set up simulation studies within this conceptual framework, exploring specific management challenges relevant to the respective scale of investigation. Next to the modelling activities, FORMASAM has maintained an active link to the UNECE FSOS process and several of the FORMASAM members are now involved as active co-authors in the FSOS, leading the climate change chapter.

Homepage: www.pik-potsdam.de/formasam