

Future climate impacts: relevance to old and new forests



Sustainable forest management requires evidence-based research as a basis for decision making. Critical components for our ability to react to projected climate change with anticipatory management actions are the understanding of the role and functions of ecosystem legacies in shaping mechanism of ecological resilience.

The main aim of the FORDISMAN is to gain new knowledge in the area of natural disturbance regimes and forest ecosystem processes. An ecosystem understanding integrates physical and chemical processes with an understanding of the adaptations of individual organisms. An understanding of these ecosystem processes in a social and economic context requires both a multidisciplinary and an interdisciplinary approach. The challenge is to



bring a wide range of subject matter experts together to develop a shared understanding of the ecosystem processes. The resulting understanding will lead to improved forest resource utilization and planning.

RELEVANT

Does traditional forest management ensure the resistance and resilience of forests with anticipated climate change?

Land use change and ensuing patterns of legacy syndromes will be subject to thorough analysis, which may answer the question about resilience or non-equilibrium nature of an ecosystem. Anticipatory management contains also a wide array of restoration measures.

Management doctrines often project restoration and legacy syndromes in a way leading to

During the Hyytiälä Forest Station workshop (November 7–9 2018), from left: Sille Rebane (PhD student), Marek Metslaid, (Senior Research Scientist), Floor Vodde (Research Scientist), Jukka Pumpanen (Professor), Kajar Köster (Research Scientist).

Photo: Kalev Jõgiste

unstable and unpredictable scenarios. Climate change impact on the legacy syndromes and ecosystem resilience may be the key to answer the question. Therefore, the comparison of forest ecosystems with manipulated legacies (artificial legacies of land use change or restoration, traditional and intensive logging systems with natural or artificial reforestation) with near-natural (primary and permanent) forest is a most promising line of further research. For example, the land use change from agriculture to secondary forest creates routes with options of legacy manipulations: restoring natural (naturalness is desired) species composition via planting trees, leaving the sites for spontaneous secondary succession or designing vegetation resilient to anticipatory climate changes (tree savannah, bushlands, etc). With all the options mentioned the resilience in some form is pursued.



NORDIC DIMENSION

Forest ecosystems within and throughout the Nordic states and Baltic Sea region share similar characteristics, but can also differ considerably, due to management decisions, variety in habitat and climatic conditions. Often, a forest landscape consists of pure, planted stands, alternated with mixed stands of spontaneous regeneration. Sharing experience with management in the light of disturbance events is crucial, since

management actions that are effective in one country will not necessarily work in another. Superimposed with expected changes in climate and management policy, the complexity of forest dynamics requires an integral research approach and analysis frame on the road to sustainability.

The work organised under the project title is a common effort of colleagues from different countries. The research topic (forest disturbance studies and carbon management) requires a common protocol to carry out measurements and analysis. The opportunity to unify the research protocols is delivered with the current project. Knowledge exchange for research methodology is essential presumption for successful scientific endeavour.

Past events have shown that, fortunately, the representatives from different countries come also with rather contrasting methods for forest disturbance ecology studies. The knowledge ensued from interdisciplinary approach produces better prediction capacity in the face of climate change.

When developing the joint publication (manuscript preparation) the most urgent requirements with the research methodology become visible. This enhances the questions for research synergy expected from co-operation between different countries

CONCLUSION

Naturalness often predetermines which legacy syndromes may have resilient patterns. Artificial legacies can insert the component of non-resilient behavior. Ecosystem management and restoration is aimed at components producing (managing) mechanisms of ecosystem resilience via legacies (e.g. adding CWD, desired plant species).



Excursion to SMEAR II (during the Hyytiälä Forest Station workshop, November 7–9 2018), measurement equipment, from left: Henn Korjus (Professor), Floor Vodde (standing with back, Research Scientist), Marek Metslaid (Senior Research Scientist), Christine Ribeiro Moreira de Assumpcao (PhD student) Kajar Kõster (Research Scientist), Silje Rebane (PhD student).

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