

**New policy and business models for the sustainable provision of Forest Ecosystem Services  
- Development of an analysis framework**

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## **Abstract:**

**Introduction:** There is a need for innovations for sustainable provision of Forest Ecosystem Services as required by policy, society and economy. These demands are the objective of the project InnoForEST<sup>1</sup> under the frame of Horizon2020, in order to spark a transformation of the European forest sector by stimulating innovations for the sustainable provision of the wide range of forest ecosystem services such as for carbon storage, biodiversity protection, recreation etc. are reflected in current policy frameworks for rural development and accompanying research programs. Understanding success factors of novel policy and business models, and especially the role of the biophysical conditions of forest ecosystems, as well as the institutional context in which policy instrument mixes and business models evolve, is critical for successful implementation of novel solutions. These surrounding conditions have an influence on the design and the functioning of governance innovations. To increase the understanding of these contextual biophysical and institutional conditions and their interplay, a social-ecological-technical and institutional analysis framework will be developed to analyse influencing factors in different European contexts for policy and business models to work. The project will support the governance of viable innovations and a multi-actor network by building on pioneer innovations, and by involving key stakeholders from forest and forest-related policy, administration and business.

**Literature:** To date, links between the provision of (forest) ecosystem services, direct and indirect anthropogenic drivers of change (in demand and supply structure), including socio-economic determinants (e.g. demands for biomass from bioeconomy, diversification of societal interests for forest uses) and governance aspects (type of policy instruments, multi-level and multi-sector interactions), have been defined mostly on a conceptual level (e.g. de Groot et al., 2010; Potschin and Haines-Young, 2011; van Oudenhoven, 2012). Especially with regards to resilience, research into social-ecological systems has recognised technology as key factor (e.g., Young et al., 2006). Related to forest ecosystem services, neither technological factors nor institutional information have been systematically connected to biophysical conditions to understand the plethora of factors influencing their provision. Socio-technical systems are crucial to forest ecosystem services, as information and communication technology is part of ecosystem service infrastructure and exchange processes (cf. Smith and Stirling, 2010).

The framework and its application aims to advance the understanding of the interlinked social-ecological, technological forestry systems. It will do so by refining existing conceptual frameworks (Ostrom, 1999), and empirical testing based on the stock taking and in country cases. Building on this knowledge crucial biophysical, governance and economic factors, e.g. characteristics of actors, markets or specific institutional settings, will be identified that are essential for designing tailor-made, place-based governance and business solutions for forest ecosystem services. This information will be the basis to match policy and business innovations to ecological context conditions as well as to socio-cultural needs and demands, increasing their acceptance, and making them effective.

**Methodology:** The transfer and upscaling of policy instruments and business models for provision of forest ecosystem services can only be successful when system conditions/interactions are understood. A system approach allows to understand the patterns and factors that enable and constrain efforts for creating, implementing and using policy instruments and business models. In the case study regions, conceptualised as social-ecological systems, the provision of FES is determined by biophysical conditions and institutions, such as hierarchies, network initiatives or market mechanisms, and different mixes of policy instruments (Kivimaa and Mickwitz, 2012; Makkonen et al., 2015; Primmer et al., 2015; Loft, Mann and Hansjürgens, 2015).

The current timeframe has the goal to finish the framework in September/October in order to start the implementation in the case study areas in beginning of 2019. Milestones are set for the end of February with a summary of current research results and conceptual graphic, including a case study example. In March, intermediary results will be compared with the objectives and if necessary redefined. The concept paper is targeted for April and the first draft is set for July.

**Results:** The conceptual analysis framework will facilitate the transfer and up-scaling of existing niche models identified and the development of new innovations, to demonstrate the feasibility of alternative income streams from a diverse set of forest ecosystem services. The core elements of the overall project InnoForESt are: multi-actor networks, digital and physical innovation platforms, facilitated innovation processes for business and policy making, information generation and support for future national and EU forest policy making. Within the networks, stakeholders will exchange ideas, knowledge and practices on innovation platforms. The project will scale up

the results to the European level, making use of the thorough understanding of Europe's social-ecological landscape as well as sustainability impacts of different governance mechanisms. The lessons will feed into a roadmap for the provision of forest ecosystem service bundles and a broad range of dissemination and communication activities. Ultimately, this will lead to better policy coordination, the well-being of EU citizens and the ecological integrity of forest ecosystems.

**Implications:** By providing clear procedures for how policies and business innovation processes can be developed the following overall impact can be reached: Policy makers gain a better understanding of which governance mechanisms or instruments work under which framework and context conditions to encourage innovation in the forestry sector which positively impacts on their uptake. Furthermore, Stakeholders, particularly the business sector, get informed about new opportunities for job creation and diversifying their income.

The implications for forest owners are diversifying their portfolios. Stakeholders in case studies, specifically business sector benefit from new businesses making use of behavioral knowledge and new income streams and job- opportunities.

By creating incentives for FES provisioning the impact for the society will be increased provision of forest ecosystem services with public good or common pool character incentivized through payments for ecosystem services for society. Also, improved estimates how payments for ecosystem services impact on socio-economic factors (besides environmental factors) in view of sustainable development. Finally, increased income generated from such payments for ecosystem services for private and public forest owners.

**Keywords:** Forest Ecosystem Services, Governance Innovations, Social-Ecological Systems, Innovation dynamics