Achieving multifunctional forest management through three-level structured silvicultural regimes: a review of case studies and pilot demonstration progress in China

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Multifunctional forest management (MFFM) has been the new trend in forestry development in China and the world in the 21st century. It is an innovative model which actively strengthens and develops the many forest services and provides social, economic, environmental and ecological benefits for sustainable human development. The fundamental objective of forest management is to establish and maintain the stability and resilience of the forest ecosystem to maximize its viability, productivity and service functions. In this review the concept, scientific principles, technical processes and methodology for experimental verification of the silvicultural regimes (SRs) of MFFM are described. In addition, the paper addresses a three-level structured silvicultural technical system (STS) and Chinese MFFM development system which, based on the principle of using natural and artificial forces synergistically, integrates function/condition constrains, full growth/management cycle and standardized description of measures and elements of the final target. By monitoring, comparing and analyzing data from operational and reference plots of applying this STS as a national basis for forest management were compared. These results show that the objectives of MFFM models are being achieved and the new STS with three-level SR has a positive impact on the development of multifunctional forestry in China.

Risk and governance dilemmas associated with assisted migration in the forest sector of British Columbia, Canada

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The assisted migration (AM) of trees is increasingly being proposed as a means of adapting forest management to climate change impacts. While there is a proliferation of natural science research to inform the implementation of AM, social science research in this domain remains relatively sparse. We use the case of the Canadian province of British Columbia (where AM policy is currently in development) to examine the human behavioral (e.g. perceived risks), and governance (e.g. participation in decision-making and the use of different forms of knowledge) dimensions of this emerging policy option. Based on 30 in-depth, semi-structured interviews with key government officials and forest industry professionals involved with AM, we find an overall optimistic view of AM. However, we identify three emergent dilemmas: i) narrow conceptions of the types of evidence that is required in decision-making (mostly biophysical), ii) uneven input from different stakeholder and rights holders, and iii) prevailing views that knowledge flows in a linear fashion at the science-policy interface. These findings demonstrate the contributions that social sciences (produced at multiple scales and from different worldviews) can make to decision-making for the implementation of assisted migration.

B1d: RESILIENCE OF MANAGED TROPICAL FORESTS: IT IS TIME FOR SILVICULTURE

Disturbance intensity determines recovery of multiple functions after a first logging cycle in the Brazilian Amazon

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Sustainable forest management is based on the assumption that forest ecosystems are resilient to silvicultural interventions so that their ecosystem functions can recover between felling cycles and thus be maintained in the long term. However, our understanding of responses to silvicultural interventions and factors driving tropical forest resilience is rather limited. Here, we investigated how management intensity and post-logging (remaining) biological legacies (basal area and species diversity) affect the resilience of important forest attributes and functions related to biodiversity conservation, carbon sequestration and timber provision within 30 years following initial logging. We analysed data from a unique long-term experiment located in the Tapajós National Forest, Pará, Brazil, where trees ≥ 5 cm DBH were measured on 8 occasions in 41 permanent sample plots including unlogged forest. Management intensities comprised logging (1982) with associated damage and follow-up thinning (1993-1994). An important finding was that the recovery of tree species composition, above-ground biomass and timber stocks was impaired when basal area was reduced by more than 20% relative to pre-logging stocks. In contrast to our expectations, remaining basal area and diversity had no effect, but management intensity determined the recovery of multiple functions over the first logging cycle. Thus, when managing for ecosystem resilience within current felling cycles, our findings indicate that management intensity will directly affect the recovery capacity and subsequent ability of continuous provision of goods and services in these managed tropical forests of the Eastern Amazon.

The main challenges of sustainable forest management in the Amazon: why sustainable forest management in the Amazon should be reinforced?

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Since the last 50 years, tropical natural forests have been intensively logged in the tropics to supply the increasing demand of tropical timber. Unplanned logging operations caused forest degradation leading to their conversion due to the loss of their commercial value. Today, natural forests remain a major source of timber and tropical production forests worldwide are estimated to cover around 400 million ha. Studies carried out on the long term impact of logging on timber yield showed that at best about only 50% of the timber volume extracted during the first harvest will be available for the subsequent cycles. We estimated the potential of natural production of the Amazonian forest to supply the future wood demand using more than 200 permanent plots for monitoring the long term response after logging of the TmFO network. Our results clearly show that natural forests alone will not be able to supply the increasing demand of tropical timber in the region and that significant efforts in forest restoration through plantations as well as intensive silvicultural practices such as enrichment planting in gaps and liberation, must