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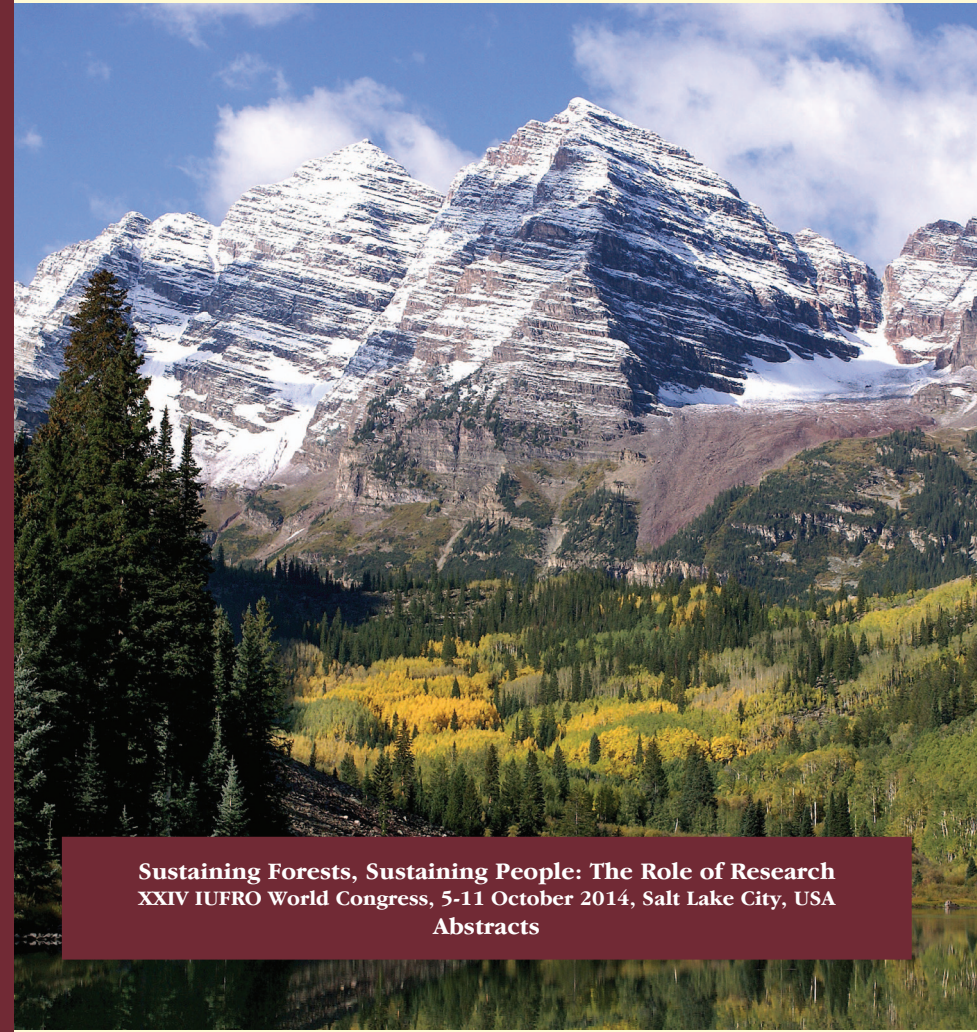
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# The International Forestry Review



Sustaining Forests, Sustaining People: The Role of Research  
XXIV IUFRO World Congress, 5-11 October 2014, Salt Lake City, USA  
Abstracts

THE INTERNATIONAL FORESTRY REVIEW  
XXIV IUFRO World Congress  
Vol. 16 (5), 2014

EDITORS: JOHN A. PARROTTA, CYNTHIA F. MOSER, AMY J. SCHERZER, NANCY E. KOERTH and DARYL R. LEDERLE

International Forestry Review (print) ISSN 1465-5498  
International Forestry Review (online) ISSN 2053-7778

Vol.16(5), 2014

PUBLISHED BY THE COMMONWEALTH FORESTRY ASSOCIATION

www.cfa-international.org

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Forestry Review*



**Sustaining Forests, Sustaining People:  
The Role of Research**

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**Abstracts**

EDITORS

JOHN A. PARROTTA, CYNTHIA F. MOSER, AMY J. SCHERZER,  
NANCY E. KOERTH and DARYL R. LEDERLE

Carbon, water, and nutrient fluxes have been monitored intensively over entire rotations in experiments manipulating rainfall and nutrition in *Eucalyptus grandis* plantations in southern Brazil. These studies question the relevance of some silvicultural practices well established in regions with relatively high annual rainfall. The early tree growth does not always need to be maximized; weeding can also be important after canopy closure; K fertilization is not always beneficial to face drought; it is not always necessary to split the applications of N and K fertilizers to prevent losses by leaching; and sodium application can enhance tree growth in K-deficient soils. We show that studies carried out at a single site can have broad applications for the management of tropical plantations, provided that they improve our comprehension of the mechanisms driving tree growth. In addition to multi-local trials, multidisciplinary research at a few sites associated to modelling and remote sensing is needed to adapt silvicultural practices to global changes.

**Sustainable pathways for primary forest under a changing climate: ecological, social, and economic constraints.** Mackey, B. (*Griffith University, Australia; b.mackey@griffith.edu.au*), DellaSala, D. (*Geos Institute, USA; dominick@geosinstitute.org*), Kormos, C. (*The WILD Foundation, USA; cyril@wild.org*), Zimmerman, B. (*International Conservation Fund of Canada and the Environmental Defense Fund, Canada; b.zimmerman@wild.org*), Young, V. (*Forests Alive Pty Ltd, Australia; virginia@forestsalive.com*).

This paper reviews the evidence for ecologically sustainable forest management in primary tropical forests in terms of wood supply, biodiversity conservation, greenhouse gas mitigation, and adaptation to projected climate change impacts. We identify ecological, social, and economic constraints on the sustainable use of primary tropical forests and recommend approaches that will retain their defining characteristics. Globally, only around 18% of the world's natural distribution of primary forests persists. Tropical primary forests are under increasing pressure as developing countries seek to exploit their natural resources. Furthermore, it is now 95% certain that rapid, human-forced climate change will impact on all biomes including the tropics. Decades of monitoring and evaluation now point to the limitations of industrial-scale logging as a conservation strategy in primary tropical forests. A development pathway is needed that maintains the defining characteristics of primary tropical forests so that their greenhouse gas mitigation function is maximised and to help ensure their resilience and adaptive capacities remain intact. Two case studies are presented of community-based forest management in the Brazilian Amazon and Southeast Asia which illustrates how alternative development pathways can be designed and implemented.

**Forest resilience depends on stand variations: forest dynamics of an Amazonian forest 30 years after logging.** Mazzei, L., Ruschel, A. (*EMBRAPA, Brazil; lucas.mazzei@embrapa.br; ademir.ruschel@embrapa.br*), Silva, J. (*Federal Rural University of the Amazon, Brazil; silvanatalino734@gmail.com*), Schwartz, G. (*EMBRAPA, Brazil; gustavo.schwartz@embrapa.br*), de Carvalho, J. (*Brazilian National Council for Scientific and Technological Development, Brazil; olegario@pq.cnpq.br*), Kanashiro, M., Lopes, J. (*EMBRAPA, Brazil; milton.kanashiro@embrapa.br; carmo.lopes@embrapa.br*).

A polycyclic selective cutting system has been used in the Brazilian Amazon; current protocols were mainly developed through harvesting experiments established since 1975. Such experiments represented a remarkable start on the further application of reduced impact logging in Brazil. One of those experiments, specifically about logging for timber production, was carried out at the Tapajós National Forest in 1979. The timber volume harvested was 72 m<sup>3</sup>/ha or 16 trees/ha that immediately removed 25% of the total carbon stock in the forest. In the present study, the circumstances where natural forest management can be applied as a conservation tool were evaluated using data from the Tapajós National Forest logged area. Hence, three types of forest ecosystem values were assessed along 30 years of forest dynamics to determine forest resilience: 1) commercial volume, 2) floristic composition and diversity, and 3) carbon stock. The results showed that variations in stand structure and forest composition due to harvesting led to a recovery of the carbon stock, which provided 62 m<sup>3</sup>/ha of merchantable volume. The forest resilience for timber production depends on these variations through time, representing the silvogenesis stage 30 years after logging.

**Harvest regulation for multiresource management, old and new approaches.** Mendoza, M. (*Colegio de Postgraduados, Mexico; martinmendoza@yahoo.com*).

Current Mexican forest management is the product of a history started in 1926. The earlier approaches aimed directly or indirectly to attain the normal, fully regulated forest model. Around 1980 the first considerations about multi-resource and environmental impact were mandated over all private timber operations. Concerns about water quality, biodiversity, legally protected natural areas, and endangered species were the motives for promoting in 2012, and afterwards, voluntary best management practices, because timber-oriented silviculture was deemed insufficient to take proper care of non-timber values in the forest. In this research, two Mexican traditional forest management schemes (SICODESI, Plan Costa de Jalisco), enhanced with best management practices, were compared with a management method specifically designed to manage landscape attributes. Results from a full 10-year cutting cycle for the three management techniques showed that traditional schemes, even when modified to comply with best management practices, failed to secure a forest dynamic favorable to responsible stewardship of non-timber values. The landscape technique used multiple means to drive forest dynamics to fulfill multi-resource objectives constrained by self-financing and competitive profitability in private and communal ownerships, relative to similar timber operations from the international scene.

**Past, present, and possible futures of the western Congolian lowland rainforest.** Pietsch, S. (*University of Natural Resources and Life Sciences, Austria; stephan.pietsch@boku.ac.at*), Gautam, S. (*Tree Canada, Canada; sisir\_gautam@yahoo.com*), Bednar, J. (*University of Vienna, Austria; bednarje@gmail.com*), Petritsch, R., Schier, F. (*University of Natural Resources and Life Sciences, Austria; richard@petritsch.or.at; schier.franziska@googlemail.com*), Stanzl, P. (*VMS, Gabon; stanzl225@aon.at*).

Past climate change caused severe disturbances of the Central African rainforest belt, with forest fragmentation and re-expansion due to drier and wetter climate conditions. Besides climate, human-induced forest degradation affected biodiversity, structure, and carbon storage of Congo basin rainforests. Information on climatically stable, mature rainforest, unaffected by human-induced disturbances, provides a means of assessing the impact of forest degradation and may serve as benchmarks of carbon carrying capacity over regions with similar site and climate conditions. Biogeochemical (BGC) ecosystem models explicitly consider the