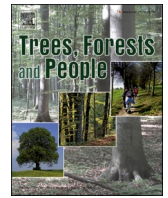


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# Trees, Forests and People

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## Wood-based solutions for forests and people: An editorial to this Special Issue<sup>☆</sup>

Tress in or outside forests have been essential in human health and well-being since the beginning of time as ecosystem goods, such as food, timber, energy, water, and other services such as climate regulation and watershed conservation. Wood is an indefinitely renewable natural resource when managed sustainably. Wood-based solutions, such as growing and utilizing woody biomass for energy, building and infrastructure construction, and as raw materials for a variety of wood products, provide a unique opportunity to tackle global sustainability challenges, such as rural development, poverty alleviation and climate change, as well as increasing food and energy security and reducing vulnerability to natural disturbances, such as storm protection and flood regulation. This special issue aims to advance our understanding of rural economic development opportunities through wood-based solutions, including climate smart agroforestry and timber harvests, especially from small-scale tree plantations owned or controlled by small holders and community groups, or from forest thinning treatments and salvage logging to improve forest health in public lands.

We credit [Nambiar's \(2019\)](#) Tamm Review for stimulating our discussions and providing a motivation for this special issue. Nambiar argued that limited success of many international initiatives for reducing deforestation and forest degradation and conserving biodiversity can be attributed to their failure to consider "practical routes to poverty alleviation" for millions of people who depend on forests for their subsistence and livelihood ([Nambiar, 2019](#)). Forcing forest-margin communities to solely rely on unpredictable payments for ecosystem services (PES) and utilization of non-timber forest products (NTFP) for their livelihood trap them in continuing poverty, while saddling them with management responsibilities ([Anderson et al., 2015](#)). This special issue explores forward-looking pathways to promote locally driven economic development with sustainable forest management and wood-based enterprises, which can be combined with PES and NTFP utilization in some circumstances.

[Nambiar \(2021\)](#), in this issue) expanded his earlier points about the important role of small-tree growers and local value-added businesses in the context of landscape restoration. As we enter the Decade of Ecological Restoration (2021–2030) declared by the United Nations, we must recognize that protecting and reviving ecosystems around the world is for people and nature (UN, 2019). While small growers are already central in growing and harvesting industrial wood in many countries, their role in restoring degraded landscapes, as well as for providing livelihoods for millions of rural households, need a better recognition. [Nambiar \(2021\)](#) calls for greater coordination among projects involving small growers to close wood supply-demand gaps that are

widening in tropical developing countries with growing economies. Better inventory of land uses and potential productivities, as well as the number and types of small-scale growers, would allow appropriate land use planning, and targeted technical and financial assistances to increase productivity per unit area and product value for enhancing overall economic outcomes and environmental benefits. [Pagdee and Morgan \(2022\)](#), in this issue) calls for rethinking the value of degraded ecosystems from "worthless" lands primed for permanent land use change to the sources of wood-based solutions for subsistence and income to impoverished people in rural and suburban areas, especially during times of hardship. Intentional promotion of agroforestry practices and NTFP collections in degraded lands can contribute to larger landscape restoration efforts to increase community support for conservation. [Saxena et al. \(2022\)](#), in this issue) explores the policy dimension of building wood-based infrastructure, using Nepal as a case study. Examining the case of Nepal, a landlocked developing nation vulnerable to seismic activity, also provide valuable insights to opportunities and barriers for building resilient infrastructure in developing countries where their vulnerability to natural disasters are exacerbated by underlying systemic conditions, including chronic rural poverty, weak governance, lack of technical capacities and unmanaged increase in urbanization devastating the country's infrastructure and laying the groundwork for disastrous outcomes ([Ribot, 1995](#); [Gerlitz et al., 2012](#)). Lack of livelihood options force rural populations to migrate to cities where they end up living in hazard-prone urban landscapes, often becoming victims to disasters ([Bhattarai & Conway, 2010](#)). These circumstances are prevalent not only in Nepal, but throughout the Himalayan region. As [Saxena et al. \(2022\)](#), in this issue) argues, forest conservation narratives often provide a rationale for limiting small-scale timber harvesting by local communities. However, allowing sustainable timber harvesting and creating more employment opportunities and income for rural communities would require policies across governing scales to use a clear and consistent definition of what constitute "sustainable" forest uses, as well as in their implementation. [Bello-Bravo and Lutomia \(2022\)](#), in this issue) examines the key elements in defining sustainability in wood-based design-solutions that are conducive for supporting real-world solutions. They argue for indigenized practices for sustainability to include holistic or systems-view with longer-term timeframes of planning and action, while promoting worldview without focusing on instrumental values of forests.

This special issue also includes several case studies to promote wood-based solutions in developed countries by examining diverse ways of utilizing traditionally underutilized woody biomass and their economic

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potentials, as well as their environmental impacts. Rockwood et al. (2022, in this issue) shows that *Eucalyptus* species, very valuable and widely planted hardwoods, can be made into biochar as soil amendment for improving plantation and crop productivity and increasing total long-term carbon sequestration. While the quality of biochar and its carbon sequestration potential vary depending on site conditions and management, Rockwood et al.'s study demonstrates significant economic potential of short rotation eucalypts biochar even in poor site conditions with infertile and sandy soil. In addition to growing and sustainably harvesting timber, wood-based solutions must explore ways to utilize woody biomass that are currently underutilized or wasted. To scale-up resource recovery of usable woody biomass volumes, such as wood processing residues, need to be estimated at appropriate scale. Saal et al. (2022, this issue) presents an approach for calculating the supply of wood processing residues with the concept of a material flow analysis and applied the calculation approach on standardized wood packaging products at the EU level. In the western U.S., one of the biggest barriers for forest restoration and fuel reduction treatments has been lack of economic values of sub-merchantable small-diameter timber resulting from the treatments, and the environmental concerns for forest operations with the history of forest logging resulting in severe watershed degradation. Elliot and Rhee (2022, this issue) evaluate the impacts of different mechanized biomass operations on different elements that determine watershed quality, such as sediment displacement, soil hydraulic conductivity, and canopy interception. Their results show limited direct detrimental hydrologic impacts due to biomass operations can help accelerate forest restoration and fuel reduction treatments that are desperately needed to fire-prone landscapes in the western U.S. as well as promoting more utilization of locally available woody biomass.

With this special issue, we hope to promote a systemic shift in how we see trees in and outside forests, and their numerous interconnections with human well-being. Even though we must recognize that forest conservation efforts may limit utilization of timber, full-control top-down strategies are unable to lead to the necessary adaptation required to reduce our reliance on fossil-fuel driven raw materials for our economic activities. Acknowledging the necessity to grow and use readily available renewable resource, such as wood, with new technologies will help for us create resilient climate-smart landscape and infrastructure for the benefit of people and nature.

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