

ENVIRONMENT

Culturing the Forest

Tobias Plieninger

Discourse about the state of forests around the globe has been dominated by two powerful conventional narratives: The first holds that tropical and subtropical forests are in a general decline, undergoing both degradation and deforestation. The second sees most forests as having been wilderness, devoid of humans, before European colonization. All kinds of human impact on these “pristine” forests will necessarily lead to their loss, with consequences on biodiversity, climate, and other life-supporting systems. This leads to an unavoidable trade-off between the use of forests for the needs of local people and the protection of forests for the greater good. Taken together, these narratives blend into a Malthusian worldview of humans degrading forest ecosystems. This mindset has been particularly powerful among scholars in the natural sciences [e.g., (1)].

Advances in several disciplines have fundamentally challenged many of these assumptions and drawn a more comprehensive picture of forest trajectories and the nexus between forests and people. For example, remote-sensing studies provide evidence of substantial resurgence of forests and woodlands in countries as different as El Salvador, Chile, China, and Vietnam (2). In contrast to classical assumptions of a “forest transition” (a shift from deforestation to net gains in forest area, often associated with economic development), recent forest and woodland expansion is not necessarily coupled to population declines but has also been recorded in densely populated areas (3). Long-term historical studies of ecosystems demonstrate that many remote and presumably “untouched” forests were actually heavily domesticated and intensely used and

The reviewer is at the Department of Geosciences and Natural Resource Management, University of Copenhagen, Rolighedsvej 23, 1958 Frederiksberg C, Denmark. E-mail: tobias.plieninger@ign.ku.dk

managed landscapes, for example, in the Amazon Basin during the pre-1492 era (4). Ecological theory suggests that conservationists may focus too much on setting up wilderness areas while neglecting the need to construct a high-quality matrix of production landscapes used for agriculture and forestry (5). According to recent thinking in the land-use sciences, sustainable intensification of forestry and agriculture strongly depends on the integration of commodity production, biodiversity, and rural livelihoods at landscape scales (6).

By assembling perspectives of leading scholars from the environmental sciences, geography, anthropology, political science, history and other disciplines, *The Social Lives of Forests* builds a multifaceted view of forests as social-ecological systems. Editors Susanna B. Hecht (University of California, Los Angeles), Kathleen D. Morrison (University of Chicago), and Christine Padoch (Center for International Forestry Research, Indonesia) are well known for advocating interdisciplinary approaches to natural resources management. They have organized the volume's 28 chapters into five sections that capture important dimensions of the human-forest relationship: conceptual frameworks, historical ecologies, market dynamics, institutions, and the urban matrix.

The Social Lives of Forests Past, Present, and Future of Woodland Resurgence

Susanna B. Hecht, Kathleen D. Morrison, and Christine Padoch, Eds.
University of Chicago Press,
Chicago, 2014. 507 pp. \$50, £35.
ISBN 9780226322667.



Forest harvest. In the Peruvian Amazon, the huge fruits of Brazil nut trees (*Bertholletia excelsa*) are called “cocos” for their resemblance to coconuts.

The book opens with a number of striking cases that illustrate how frameworks, narratives, and ideologies direct our understandings of people and their roles in forests along particular pathways and how they can blind us to other views. For example, the prevailing narrative of European forest conservation policies considers high levels of biodiversity a consequence of traditional land uses. In a stark contradiction, the dominating narrative about African nature reserves considers the very same type of traditional land uses detrimental to biological conservation.

In the historical ecologies section, several case studies deconstruct the myth of untouched wilderness in places such as Mesoamerica, West Africa, Borneo, and Southwest India. The subsequent section on market dynamics reveals the social, economic, and ecologic complexities of forest commodities such as teak, shea butter, tea, and rubber. The authors show how the commodity chains of such products can support (e.g., through niche marketing) or work against (e.g., in cases of timber branding) the livelihoods of people in forests. Another section sheds light on institutional politics, in particular on how forest tenure reforms have affected human communities in forest environments. The book finishes with a series of chapters on the role of forests in an age of urbanization.

I found *The Social Lives of Forests* more a reader than a comprehensive, structured synthesis. The case studies exhibit a range of interdisciplinary approaches and methods, with comparative, place-based research at the core. By stressing the linkages among ecosystems, human well-being, livelihoods, inequality, and poverty, it follows the lines of recent initiatives such as the ICSU/UNESCO Programme on Ecosystem Change and Society. Although the editors do not provide a concluding overview or summary chapter and

the diversity of perspectives may seem overwhelming, the volume offers at least three important messages: Human-forest relationships are far more complex than simplified views of people as agents of forest degradation suggest. Mediated by prevailing institutions, politics, land-use practices, and local environments, human impact can foster multiple forest values. Inhabited “secondary forest” can support biodiversity and ecosystem services of magnitudes comparable to those of the often idealized “primordial” forest. In addition, we need to expand our under-

standing of forest to include urban parks, farm trees, wooded pastures, hedgerows, and other anthropogenic woodlands. These alternatives exhibit disparate trajectories of change and provide contributions to human well-being different from those of closed forests. Third, all types of forests—even old-growth—embody legacies of human land use, which need to be acknowledged to better understand forest dynamics and to guide forest conserva-

tion efforts. *The Social Lives of Forests* offers sophisticated, positive perspectives on forests around the world. The authors' stimulating ideas address important questions of forest dynamics and management. They also apply to the creation of working landscapes that offer space for people and nature everywhere.

References

1. J. Terborgh, *Requiem for Nature* (Island, Washington, DC, 1999).

2. P. Meyfroidt, E. F. Lambin, *Annu. Rev. Environ. Resour.* **36**, 343–371 (2011).
3. E. F. Lambin, P. Meyfroidt, *Land Use Policy* **27**, 108–118 (2010).
4. M. J. Heckenberger, J. C. Russell, J. R. Toney, M. J. Schmidt, *Philos. Trans. R. Soc. London Ser. B* **362**, 197–208 (2007).
5. I. Perfecto, J. Vandermeer, *Proc. Natl. Acad. Sci. U.S.A.* **107**, 5786–5791 (2010).
6. J. Scherr, J. A. McNeely, *Philos. Trans. R. Soc. London Ser. B* **363**, 477–494 (2008).

10.1126/science.1250655

NATURAL DISASTERS

More Common Than We Think

Donald Turcotte

A large fraction of Earth's population can be adversely affected by earthquakes, volcanic eruptions, tsunamis, tornadoes, hurricanes, and floods. Many people fear the consequences of natural disasters, but few have even the most primitive appreciation of the risks. A student taking one of our natural hazards courses this year came up to the professor after a lecture and said, "We live on the Hayward fault; I didn't know we are at risk."

Almost every university offers a variety of courses on natural hazards, and professors have a wide selection of excellent textbooks from which to choose. However, their contents and costs make these accounts inappropriate for the general public. In *The Dynamics of Disaster*, Susan Kieffer addresses this void. Kieffer (a geophysicist retired from the University of Illinois) offers a fast-moving, interesting bedtime read. She imparts a range of knowledge of the risks of natural hazards in a relatively painless way that educates but also entertains. I found her inclusion of personal experiences (e.g., with earthquakes in California, tornadoes in Illinois, and floods in Australia) particularly appealing.

In the introductory chapters, Kieffer sketches a framework for understanding those disasters "caused by the ongoing geological processes on our planet." She notes that these events "result from changes of state in a system through modifications of its materials, energy, or both." After providing a short overview of the dynamics of disasters, she embarks on a

global field trip that samples their diversity.

For example, the chapter "When Terra Isn't Firma" comprises a series of short discussions on various aspects of earthquakes. Kieffer summarizes the consequences of a few major earthquakes, such as Sumatra (2004) and Japan (2011). She relates the vastly different death tolls in the magnitude-seven Haiti (2011) and New Zealand (2011) quakes to building standards. The chapter puts particular emphasis on the risks of liquefaction, and it also describes the poorly understood phenomenon of "earthquake lights."

The author covers tsunamis and ocean waves in a similar way. She describes the nature and consequences of run-up for major tsunamis. These rarely come ashore as "the spectacular wall of water ... depicted in some movies." Rather they seem like cycles of high and low tides compressed within an interval of tens of minutes. Examples of rogue waves

(single isolated gigantic waves or sets of several huge waves) provide an entertaining contrast with tsunamis (which are tiny on the open ocean). In a relatively well-documented case from World War II, RMS *Queen Mary* and the 16,000

troops aboard encountered a 90-foot-high wave in the North Atlantic that tipped the ship to a 52° list (3° short of the design limit for capsizing).

The inviting presentation of landslides includes examples of occurrences large and small, some historical and some from the geological record. (Among the latter: Fifty million years ago, at Heart Mountain, Wyo-



Aftermath. Grandmother and granddaughter searching through the rubble of their home (Miyagi Prefecture, Japan), which was destroyed in the Tohoku tsunami (11 March 2011).

ming, a sheet of rock flowed more than 50 km and covered 3300 km² in an event Kieffer estimates lasted less than an hour.) In a similarly broad and interesting treatment of atmospheric phenomena, Kieffer discusses disasters such as tornado outbreaks and severe hurricanes. She provides relatively painless introductions to Coriolis "forces" and Hadley cells as well as an engaging account of atmospheric vortices ("rotors").

The book concludes with considerations of how the public can be informed about and protected from natural disasters. Here Kieffer notes the chilling implications of the convictions of Italian seismologists for their alleged failure to warn the public of seismic risks prior to the 2009 L'Aquila earthquake.

Although some specialists may find the discussions superficial, it is hard to delve into details when considering such a broad topic in a restricted number of pages. The black-and-white illustrations may represent another compromise: while not particularly attractive, they help keep the book's price relatively low. In general, I found *The Dynamics of Disaster* a good read and strongly recommend it.

10.1126/science.1250654

The Dynamics of Disaster

by Susan W. Kieffer

Norton, New York, 2013.

331 pp. \$25.95, C\$27.50.

ISBN 9780393080957.

The reviewer is at the Department of Earth and Planetary Sciences, University of California, Davis, CA 95616, USA. E-mail: dlturcotte@ucdavis.edu