



Sharma, Lila Nath. 2016. The disturbance-diversity relationship: integrating biodiversity conservation and resource management in anthropogenic landscapes

Carl Beierkuhnlein, Shonil A. Bhagwat & Kerstin Potthoff

To cite this article: Carl Beierkuhnlein, Shonil A. Bhagwat & Kerstin Potthoff (2017) Sharma, Lila Nath. 2016. The disturbance-diversity relationship: integrating biodiversity conservation and resource management in anthropogenic landscapes, Norsk Geografisk Tidsskrift - Norwegian Journal of Geography, 71:5, 313-314, DOI: [10.1080/00291951.2017.1370494](https://doi.org/10.1080/00291951.2017.1370494)

To link to this article: <https://doi.org/10.1080/00291951.2017.1370494>



Published online: 22 Sep 2017.



Submit your article to this journal [↗](#)



Article views: 45



View related articles [↗](#)



View Crossmark data [↗](#)

Doctoral Thesis Reviews – Anmeldelse av doktoravhandling

Sharma, Lila Nath. 2016. *The Disturbance-diversity Relationship: Integrating Biodiversity Conservation and Resource Management in Anthropogenic Landscapes*. Dissertation for the degree of philosophiae doctor, October 2016. Department of Geography, University of Bergen. 150 pp. ISBN 978-82-308-3228-8.

The thesis explores disturbance–diversity relationships in anthropogenic landscapes with particular focus on study sites in mountain regions of Asia, drawing on empirical research conducted in subtropical landscapes in Nepal. Four case studies examine the disturbance–diversity relationships across space (including elevational and land use gradients) and time (years and decades). The thesis covers a wide range of spatial settings, including farmland mosaics, agroforestry plantations, open-canopy and closed-canopy forests, and grassland. Sharma engages with the literatures on ecology and conservation when examining the tensions in the literature as to how to reconcile biodiversity conservation and the provision of rural livelihoods.

The thesis consists of an introduction, followed by a collection of three published papers and one submission-ready manuscript:

Paper I: Sharma, L.N., Grytnes, J.-A., Måren, I.E. & Vetaas, O.R. 2016. Do composition and richness of woody plants vary between gaps and closed canopy patches in subtropical forests? *Journal of Vegetation Science*. DOI: [10.1111/jvs.12445](https://doi.org/10.1111/jvs.12445)

Paper II: Sharma, L.N. & Vetaas, O.R. 2015. Does agroforestry conserve trees? A comparison of tree species diversity between farmland and forest in mid-hills of central Himalaya. *Biodiversity Conservation* 24, 2047–2061.

Paper III: Sharma, L.N. & Vetaas, O.R. Decline in anthropogenic disturbance in Himalayan montane forests have negative impacts in floral richness. [unsubmitted manuscript]

Paper IV: Sharma, L.N., Vetaas, O.R., Chaudhary, R.P. & Måren, I.E. 2014. Pastoral abandonment, shrub proliferation and landscape changes: A case study from Gorkha, Nepal. *Landscape Research* 39, 53–69.

The concise introduction to the thesis helps to put the subsequent papers into context. Based on the explanation

of current problems and challenges, the introduction illustrates the close link between human activities and the traits of ecosystems. A key point is that disturbances are fundamental for the understanding of ecosystems and plant communities worldwide. The thesis underlines that disturbances are a substantial driver for most ecosystems and in particular for mountain ecosystems. Although such irregularities may be confusing, they should not be perceived with a negative notion. By contrast, many systems and even species populations are dependent on disturbance events.

The first part of the introduction presents the overall and the specific objectives of the thesis. The overall objectives are twofold. First, the thesis sets out to improve the ‘understanding of the relationship between resource use expressed in terms of “disturbance” and biodiversity conservation with a focus on plant species richness and composition’ (p. 2). Second, it endeavours ‘to contribute to our understanding [of] how floral biodiversity conservation can be harmonized with human use of resources’ (p. 9). Although the first objective is extensively addressed, the second objective could have received more explicit attention, for example by elaborating in more detail how biodiversity conservation can be harmonized with human resource use. The remaining part of the introduction comprises a presentation of the Himalayan vegetation and land use regimes, the study area, the applied methods, main results, and a comprehensive discussion. The findings are summarized well in the introduction and lead to the conclusions in a convincing manner. The introduction ends with research outlooks and perspectives, which provide a valuable orientation for future studies.

Paper I addresses the dynamics of subtropical forest ecosystems when comparing gaps and closed-canopy patches. The results show that gaps do not generally show higher plant species richness of woody plants, as it could be expected due to the availability elsewhere of the limiting resource of light and as is often pointed out in theoretical studies. This implies that natural dynamics could be less important for the maintenance and promotion of subtropical forest biodiversity than previously assumed. These findings will most likely stimulate further investigations in order to prove the generality of the statements in the paper.

Paper II deals with the direct interaction between human action and the preservation of species richness in the case of tree species within agroforestry systems. Human pressures are increasing in subtropical and tropical countries, and the continuous extension of land use is seen as a major

threat to global biodiversity. Surprisingly, Paper II shows that tree species diversity can be even higher in farmland landscapes than in forest regions. Although differences in tree species composition are detected, this gives an optimistic impression of the coexistence of tree species and human activities. However, it needs to be acknowledged that the presence of tree species does not reflect the delivery of forest ecosystems services to the local communities, meaning that even under the presence of many tree species, ecosystem functions are likely to be diminished.

Paper III addresses the declining anthropogenic influence in Himalayan montane forests and the negative consequences for phytodiversity. As in many marginal landscapes, the modern lifestyle causes migration to economic centres and the loss of former well-functioning societal structures. The abandonment of villages and demographic changes in general have long been a major problem in European landscapes. However, this problem has been rarely stated and even more rarely investigated in subtropical mountains. The results presented in Paper III show that there has been a clear decline in alpha diversity over time when total species richness is considered. By contrast, woody species have been increasing and this is reflected in the encroachment of forests and woodlands that are more natural, but less diverse than the previous cultural landscapes.

Paper IV continues the discussion of the topic presented in Paper III, but is more focused on semi-natural grassland. Changes in pastoral landscapes (due to changes in grazing and fire regimes) are investigated, and are related to shrub and tree encroachment. Additionally, management practices and policy implications are discussed. The paper provides clear guidance to practitioners for future land use from the perspective of ecosystem services that are threatened or have already been lost when traditional pastoral land has been abandoned.

The lack of research in Asian mountains is related to the history and societal development of this area, but also to difficulties in accessibility and the high degree of effort needed to carry out studies under these conditions. Knowledge gaps in the existing literature are manifold and evident.

However, the thesis addresses important research deficits and shortcomings of previous studies. Furthermore, it supplies new insights and stimulating perspectives for future research. In recent years, disturbance–diversity relationships have induced substantial debates in ecology and geosciences. The present thesis makes constructive contributions to those debates. Moreover, Sharma has applied the ecological knowledge of disturbance–diversity relationships to the real-world conservation challenge of landscape management in the face of growing demands for natural resources and increasing needs for conservation in developing countries. The thesis therefore contributes to the development of concepts that are relevant to conservation and land use planning, and can now be based on a more sound scientific knowledge. The results challenge the established notions of conservation management (often rooted in wilderness preservation ideologies) in landscapes that are highly human-dominated.

As Nepal is rich in natural resources and at the crossroads of development, research conducted in the country can provide helpful insights into biodiversity conservation and the provision of rural livelihoods in other countries in the Global South. In this respect, Sharma's thesis makes an important contribution to the understanding of landscape management for conservation and development in the Global South.

Carl Beierkuhnlein
Department of Biogeography, University of Bayreuth, Universitätsstr.
30, DE-95447 Bayreuth, Germany

Shonil A. Bhagwat
Department of Geography, The Open University, Walton Hall, Milton
Keynes, MK7 6AA, UK

Kerstin Potthoff
Department of Geography, University of Bergen, P.O. Box 7802, NO-
5020 Bergen, Norway

Editors: Ivar Berthling, Catriona Turner

<https://doi.org/10.1080/00291951.2017.1370494>

