

論文要旨 Dissertation Abstract

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論文題目 Dissertation Title	Reconsidering Terrestrial Biological Conservation Towards Balancing between Biodiversity and Ecosystem Services	
<p>Halting the loss of global biodiversity is one of the most urgent and challenging tasks facing global human society. Because species do not recognize political borders, multilateral and regional forms of cooperation, entailing careful consideration of economic and cultural relationships are necessary to conserve biodiversity. The framing of international goals for defining policy norms and shaping the behaviors of individuals and organizations is critical for the strengthening of such cooperation. In October 2020, future global biodiversity conservation goals will be formulated at the 15th meeting of the Conference of the Parties to the Convention on Biological Diversity in Kunming, China. This study explores the practical implications of the new goals relating to terrestrial biodiversity conservation, focusing specifically on the following two questions. (1) How can existing biodiversity conservation schemes be improved? (2) How can a balance be achieved between the protection of biodiversity and ecosystem services?</p> <p>Whereas almost all biologists have advocated the expansion of protected areas, some have also pointed to the necessity of improving existing ones to maximize conservation gains. In Chapter 2, I present a case study that provides inputs for improving the quality of conservation through a reconsideration of criteria for biodiversity hotspot. I initially identified possible biodiversity hotspot and subsequently compared the rate of historical land-use change in the identified regions and in existing biodiversity hotspots. The results showed that the rate of land-use change in biodiversity hotspots was significantly lower than the rates in the identified regions, suggesting that rapid land-use change accentuates the threat posed to endemic plant diversity. Thus, it is likely that biodiversity hotspots support many species vulnerable to the rate of land-use change (i.e., species with low dispersal abilities or high sensitivity to invasive alien species) and that suppression of rapid land-use change and specialized protection of such vulnerable species increase the efficiency of conservation.</p> <p>The concept of ecosystem services is often considered a competing approach in relation to traditional biodiversity conservation, resulting in ethical and practical conflicts between these two environmental management frameworks (i.e., human-centered vs. nature-centered conservation). In light of my review of the literature, in Chapter 3, I explore a potential strategy for balancing biodiversity conservation and the protection of ecosystem services that entails the subdivision of ecosystem services into global-public and local-public services. I show that in the case of local-public ecosystem services, the introduction of a bottom-up biodiversity conservation regime, wherein beneficiaries identify the source area and protect biodiversity to keep the quality of these services has significant potential for achieving the balance. Global-public ecosystem services, by contrast, are highly compatible and consistent with the application of traditional conservation frameworks. Moreover, consideration for the services is likely to lead to higher-level ecosystem management in a changing world.</p>		

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Currently, bottom-up conservation focusing on local-public ecosystem services is rarely applied because links with nature are not generally recognized. In Chapter 4, as a preliminary step toward promoting recognition of these links, I visualize spatially limited areas of five ecosystem services in Japanese forests: edible wild plants, crop pollination, water purification, noise attenuation, and flood control. My findings indicate that while there were considerable variations in the spatial limitations by the services, which ranged from 3.3% to 93.1%, there were no cases of zero limitations. Further, existing protected areas tended to be located in areas that were spatially limited with regard to edible wild plants and crop pollination. These findings indicated that the application of ecosystem services values within decision-making processes without considering social perspectives could result in the overlooking of locations where human well-being is strongly connected with ecosystems.

Finally, in Chapter 5, I outline some of the implications and give suggestions for post-2020 conservation targets. First, efforts should be made to improve conservation planning and design within existing protected areas based not only on monitoring results but also on the application of the latest data and scientific evidence. Second, it needs to create a transparent conceptual framework and a system for classifying ecosystem services. Third, the dissemination of bottom-up biodiversity conservation and biodiversity-friendly agriculture and forestry should be encouraged to ensure the sustainable use of local-public and global-private ecosystem services, respectively.

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