



VIII Scientific Wallace Conference

Proceedings



Review and editing

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Working landscapes and native habitats for ensuring benefits for food security and nature's contributions to people

Abstract

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The expansion of homogeneous landscapes has been a major driver of biodiversity loss, climate change, and land degradation. There is an urgent need for a transition to multifunctional landscapes that provide abundant and nutritious food, as well as several other contributions essential for a good quality of life. However, it is unclear how to implement this process, especially in large-scale farming without economic subsidies. I discuss guidelines for a transition to multifunctional landscapes based on science and experience on real farms. In this transition, practitioners manage crop fields, natural habitats, and field edges. I present an iterative process for designing multifunctional landscapes.

First, areas with low opportunity cost (e.g., low crop productivity) or high appreciation of nature (e.g., in the vicinity of housing areas) are identified at a fine-scale resolution and classified into "wide" areas or "narrow" corridors (i.e., edges less than 100m wide). Then, natural-habitat restoration (at least 20% of farmland) is assigned to wide areas (and those areas with remnants of native species irrespective of size), and biological corridors are designated for edges (at least 10% of farmland designed to be 50-100m wide). Field size and configuration are redesigned to increase the efficiency of agricultural practices and edge density (e.g., smaller fields with strip cropping following environmental heterogeneity instead of large, squared monocultures).

Finally, this design is adjusted over time through interaction with stakeholders, according to cost-benefit analyses, and a process of monitoring, evaluation, and co-learning. Overall, I describe an iterative process through which large-scale farming can support biodiversity, leverage nature's contributions to people, provide more nutritious food, and stabilize crop yields and profits. Multifunctional landscapes will be critical in achieving the targets of the Kunming-Montreal Global Biodiversity Framework by 2030 and moving the world toward net-zero emissions by 2050.