Agriculturally productive yet biodiverse: human benefits and conservation values along a forest-agriculture gradient in Southern Ethiopia

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Abstract

Context

It remains unclear how agricultural landscapes can best serve multiple purposes such as simultaneously maintaining agricultural productivity and conserving biodiversity.

Objectives

Our objective was to assess how important components of biodiversity changed with different land covers, and to uncover whether particular landscapes could simultaneously deliver high agricultural productivity and biodiversity conservation.

Methods

In agriculture-forest mosaics of Southern Ethiopia, we assessed tree and bird biodiversity using detrended correspondence analyses and binomial generalized linear mixed effects models in four zones differing in cropland, grassland, and tree cover as well as agricultural production (crop, livestock feed and fuel).

Results

Tree and bird communities differed along gradients of cropland, grassland, and tree cover, implying that different species benefit from different types of land management. Bird species with smaller ranges were most abundant in the agricultural zone with highest tree cover, exceeding that of even the forest zone, and demonstrating the value of complex mosaics for conservation. The agricultural zone with the highest tree cover also had the highest total productivity in terms of crop, feed, and fuel, perhaps supported in part by ecosystem services provided by invertebrate-eating birds and trees.

Conclusions

Our results challenge current paradigms of agricultural intensification and biodiversity conservation in human dominated landscapes and point to the possibility of achieving both in multifunctional landscapes. Our work also highlights the importance of considering measures of agricultural productivity beyond mere crop yields when assessing the performance of multifunctional landscapes.

Read the article in *Landscape Ecology* [1].

Associated Project:

Food & Landscape Diversity [2]

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Links

[1] https://link.springer.com/article/10.1007/s10980-019-00770-6
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