

Improving crop yields necessary to save biodiversity, lower greenhouse emissions

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Expansion of land area used for agriculture is a leading cause of biodiversity loss and greenhouse gas emissions, particularly in the tropics. One potential way to reduce these impacts is to increase food production per unit area (yield) on existing farmland, so as to minimize farmland area and to spare land for habitat conservation or restoration.

There is now widespread evidence that such a strategy could benefit a large proportion of wild species, provided that spared land is conserved as natural habitat. However, the scope for yield growth to spare land by lowering food prices and, hence, incentives for clearance (“passive” land sparing) can be undermined if lower prices stimulate demand and if higher yields raise profits, encouraging agricultural expansion and increasing the opportunity cost of conservation.

We offer a first description of four categories of “active” land-sparing mechanisms that could overcome these rebound effects by linking yield increases with habitat protection or restoration. The effectiveness, limitations, and potential for unintended consequences of these mechanisms have yet to be systematically tested, but in each case, we describe real-world interventions that illustrate how intentional links between yield increases and land sparing might be developed.

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