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**Consequences and tradeoffs of continued agricultural expansion in the U.S.**

*Bioenergy crops could provide an environmentally friendly alternative to less productive annual crops planted on recently converted farmlands*

**The Science**

Widespread conversion of grasslands and other ecosystems into agricultural farmland for corn, soybeans, and wheat expanded U.S. cropland by more than one million acres per year between 2008 and 2016. Great Lakes Bioenergy Research Center (GLBRC) scientists found that most of these new cropland areas had lower food production than existing sites. This conversion also came at high environmental costs to pollinators, waterfowl, and native plant habitats.

**The Impact**

Many converted croplands were in arid climates and/or had steeper slopes than existing farmland, making them difficult to farm and more susceptible to soil erosion and runoff. While lower yield and additional environmental impacts could be further amplified by future cropland expansion, growing bioenergy crops like mixed perennials or switchgrass in these areas could mitigate impacts of land use change on wildlife. Since recently converted lands aren’t as productive as traditional food cropping systems, cultivating bioenergy feedstocks could provide alternative revenue sources for farmers, reduced competition with food production, and better maintenance of water quality due to soil fixation by root systems. Field-level locations of recently expanded, abandoned, and intermittently cultivated croplands identified in this research could thus be good candidate sites for growing cellulosic biofuel feedstocks.

**Summary**

Despite coinciding with periods of both high and low crop prices, the rate of conversion of grasslands and natural areas to agricultural land remained high between 2008 and 2016. Much of this new cropland could be characterized as marginal land due to erosive soils, poor drainage, and low soil nutrients and moisture relative to lands already in agricultural use. Using land models and year-over-year measurements, GLBRC researchers found that corn, soybean, and wheat yields in most of these tracts were lower compared to their counterparts on well-established farmland.

Marginal lands often provide some of the highest quality habitats for wildlife. Converting these areas to annual crops reduced resources for pollinators like monarch butterflies and disproportionately affected prime nesting sites for ducks and other waterfowl. This outsized environmental impact combined with lower yields suggests the benefits of growing annual food crops in these areas may not outweigh the costs.

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