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**Integrating bioenergy production and land management practices can boost climate change mitigation**

*Combining approaches to land use could reduce greenhouse gas levels 50% more than prior estimates*

**The Science**

Curbing climate change requires not just avoiding fossil fuel use with solar and other renewables but also reducing the amount of carbon dioxide and other greenhouse gases (GHGs) in the atmosphere. One suite of approaches to reduce atmospheric carbon includes land-based solutions such as reforestation, forest and grassland management, and sustainable agricultural practices. Another approach is expanding the production of cellulosic bioenergy to power light vehicles. Both strategies offer numerous co-benefits, such as improving biodiversity, soil health, and water quality. Current assessments of climate mitigation potentials miss the opportunity to combine these solutions. In a new modeling study, Great Lakes Bioenergy Research Center (GLBRC) scientists found that an integrated approach combining bioenergy and advanced management of crop, forest and grazing lands can provide climate benefits far greater than either approach alone.

**The Impact**

Results show that an integrated approach to land-based climate solutions in the U.S. has the potential to reduce GHG levels 50% more than prior estimates based on either bioenergy or natural climate solutions alone. This assessment illustrates the potential for technologies already known to be affordable and effective for helping to keep global warming below two degrees Celsius by the end of the century.

**Summary**

A combined land-based climate mitigation approach that includes both natural climate solutions and cellulosic bioenergy could strongly contribute to reducing GHG concentrations to levels critical for meeting end-of-century climate targets of the Paris Climate Agreement and COP26. These findings highlight the importance of pursuing bioenergy production as part of a portfolio of land-based climate mitigation strategies. GLBRC scientists modeled the climate mitigation potential of specific land management practices known to reduce GHG levels on different portions of the U.S. landscape. The team accounted for likely adoption rates, available land, and the duration of different carbon sequestration sinks. They then determined how much carbon dioxide could be sequestered by each practice without impacting food production or conservation goals.

They found that integrated land management approaches in the U.S. can mitigate the equivalent of approximately 110 (between 57-178) gigatons of carbon dioxide by the year 2100, a significant fraction of that needed to keep the global temperature in check. Future research will refine estimates by incorporating other land-based mitigation technologies still under investigation.

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**Publication**

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