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## **Foley & Donohue: Support the next generation of biofuels**

**By Jon Foley And Tim Donohue**

In the fight against global warming, carbon is key.

Stabilizing the amount of carbon in the atmosphere so we can all continue to live in the type of climate we're accustomed to is going to require drastic reductions in the amount of fossil fuels used to power our vehicles, operate our businesses and heat our homes.

Meeting these challenges will be difficult, and things certainly won't happen overnight. But it is absolutely vital that we start implementing efficiency measures now, while researchers continue their efforts to develop and perfect the renewable energy technologies of the future.

A paper published in Environmental Research Letters recently provides important direction for our efforts.

In it, a team of UW-Madison researchers led by Holly Gibbs at the UW's Center for Sustainability and the Global Environment confirms earlier findings indicating that it's a bad idea to convert tropical rainforests into farmland for biofuel production.

This situation creates something called a carbon debt, meaning the carbon released into the atmosphere when the rainforest is burned to clear the land will not be "repaid" or removed from the atmosphere by growing biofuel crops for decades or even centuries.

In other words, it will take a very long time for converted land to contribute to the overall reduction of carbon in the atmosphere.

This finding helps underscore the importance of taking a rational, big-picture approach to new energy solutions. Biofuels are no better than gasoline if they aren't contributing to the net reduction of carbon in the atmosphere. Luckily, not all biofuels are created equal.

Pursuing third generation biofuel technologies like cellulosic ethanol potentially eliminates the need to convert valuable rainforests to cropland.

Once new technology is developed, cellulosic ethanol can be created from the more than 1 billion tons of excess biomass produced in the United States each year, including things like agricultural residues and urban yard waste.

Instead of burning forests to clear land for biofuel crops, Wisconsin's trees, in the form of wood chips, can be sustainably harvested and converted into cellulosic ethanol.

Developing the technology to realize the potential of cellulosic ethanol is the main goal of the Great Lakes Bioenergy Research Center.

Once researchers crack the cellulose code, releasing the valuable sugars inside these waste products, this type of liquid fuel could provide much more energy than it took to create it.

Along the way, the Great Lakes Bioenergy Research Center is being careful to consider the long-term environmental impacts of this fuel, bringing agricultural researchers, ecologists, economists and producers together to ensure that cellulosic ethanol contributes to carbon neutrality, improved water and air quality, biodiversity, and the overall vitality of our planet.

*Foley is the founder and director of the Center for Sustainability and the Global Environment at UW-Madison. Donohue is director of the Great Lakes Bioenergy Research Center at the university.*