

WRI FACT SHEET

Rules for Fuels: Biofuels and Climate Change Impacts

As biofuel production ramps up, WRI economist Liz Marshall explains why counting all the greenhouse gas impacts associated with producing these new fuels is critical to good energy and climate policy

Q Why has the greenhouse gas impact of biofuels become a hot button issue?

A The rapid spread of biofuel production in the United States has been driven by generous federal support, including tax breaks and tariffs. The Renewable Fuel Standard in the Energy Independence and Security Act of 2007 also mandates that the volume of renewable fuels in the U.S. transportation fuel supply increases from 9 billion gallons in 2008 to 36 billion gallons by 2022 (<http://www.epa.gov/oms/renewablefuels/>). This support is often justified on the grounds that biofuel use reduces greenhouse gas (GHG) emissions from transport. As increasing amounts of land are used for biofuel crops such as corn and soybeans, however, concern is growing over whether the total net effect is to produce more, not fewer, greenhouse gas emissions worldwide.

Answering this question requires measuring the total carbon impact of producing and consuming biofuels. Two separate regulatory processes are currently developing biofuel greenhouse gas (GHG) accounting protocols to do this. The U.S. Environmental Protection Agency is developing a carbon accounting protocol for the federal Renewable Fuel Standard and California's Air Resources Board is doing the same for the state's Low Carbon Fuel Standard. These imminent, groundbreaking standards have fueled a contentious debate about how to measure the greenhouse gas emissions associated with biofuel production, with disagreement centered on whether the impacts of "indirect" land-use changes (defined below) should be included. The question has also arisen in the context of provisions included in climate legislation soon to be debated in Congress.

Q Why should indirect impacts be included in GHG accounting for biofuels?

A Fully accounting for the GHG impacts of biofuel use requires measuring emissions both from the land where biofuel crops are grown (direct impacts) and those that result from related land use changes triggered elsewhere (indirect impacts). If we only account for direct impacts, policy makers will only get part of the picture. Given that U.S. taxpayers are subsidizing biofuel production, it is critical that we understand whether using ethanol and biodiesel as transport fuels delivers global greenhouse gas benefits. While there are

Definitions

Direct land-use change in the context of biofuel production refers to the conversion of land directly into biofuel feedstock production. Measuring the greenhouse gas impacts of such conversion requires measuring the net changes in carbon storage capacity that result. For example, if Conservation Reserve Program acres are converted back into corn production, large quantities of carbon stored in the grassland may be released.

Indirect land-use change refers to the cascade of off-site conversions that can be triggered by moving acreage into biofuel feedstock production. For example, if increased corn production displaces soybean production, and soybean production then moves into carbon-rich forested areas or grasslands, such secondary conversions can result in significant "indirect" GHG emissions.

Feedstock refers to the raw materials used to generate biofuels to power vehicles. Feedstocks generally are crops rich in sugar, starch or oil. They include sugar cane and corn (for ethanol), and soybean, jatropha and oil palm (for biodiesel).

other reasons for supporting biofuel development, including domestic energy security and rural revitalization, these may not alone justify the current scale of public support.

The need for measuring indirect emissions and using the results to make sound policy judgments is urgent. As biofuel production spreads around the world, so do its cascading indirect impacts. Many feedstocks require a lot of land for growth. So an increased reliance on biofuels will increase global demand for land to meet both our existing food and fiber (e.g., timber, wood pulp) needs and the new demand for fuel. Such large-scale redistribution of land uses to accommodate biofuel production may result in substantial carbon emissions, particularly if uses such as agriculture or ranching are pushed into high-carbon forests and grasslands. Land-use changes such as these already contribute significantly to climate change, with deforestation and forest degradation accounting for approximately 12-17% of global GHG emissions, depending on calculation methodology used. Accelerating rates of deforestation could negate any greenhouse gas benefits associated with using biofuel rather than petroleum in our gas tanks.

Q Can we measure indirect impacts precisely enough to include them in a GHG accounting framework?

A The Environmental Protection Agency and the California Air Resources Board have invested significant resources in modeling and estimation tools that will allow them to quantify indirect impacts both within the United States and internationally. While the tools are new, and the current estimates vary according to assumptions made, our capacity to estimate these impacts is advancing rapidly.

We know that biofuels create indirect impacts, so we cannot refuse to try to measure them just because some constituencies have raised questions about current measurement techniques. We must design a system of measurement that incorporates existing estimates while allowing them to be updated frequently as measurement capacity improves.

Q Is including indirect impacts in policy analysis unprecedented?

A No. The resistance to expanding traditional environmental impact accounting methods to include indirect impacts is surprising, given that this same approach is commonly used in economic impact analysis. When decisions are made on promoting new industries in an area, for example, tools called multipliers are used to calculate expected economic impacts – on jobs, income and other parameters – not just in the relevant sector but throughout the local economy.

Including indirect impacts in environmental impact analysis is a similar process. Land and labor are both shared inputs that create interdependencies across sectors. If the increased use of labor in one sector means that other sectors have to adjust their labor use and management to accommodate the increased competition for labor, the impacts of that effect are accounted for in economic impact analysis. Similarly, if the increased use of land in one sector means that other sectors have to adjust their land-use practices to accommodate the original sector's growth, and in doing so incur additional environmental costs, those costs must be included in an analysis of the net environmental impacts of that growth or of policies promoting that growth.

Q Is including indirect impacts in policy analysis “unfair” to the biofuel industry?

A No. The purpose of accounting for indirect impacts is not to blame farmers producing biofuel crops for ripple effects that they cannot control. The purpose is to measure the full environmental impacts of scaling up production. Applying this comprehensive measurement methodology ensures that only those fuels that generate environmental benefits enter the sustainable biofuel markets that are created by environmental policies such as the federal Renewable Fuel Standard. Excluding products that fail to satisfy environmental performance criteria from receiving public support is fair to taxpayers, not “unfair” to producers. They can continue to compete in the marketplace as producers of all other goods do; they simply cannot qualify for the preferential treatment awarded to products that demonstrate environmental benefits.

Q What are the wider implications of this policy debate?

A The resolution of this debate will decide whether or not the climate impacts of producing and consuming biofuels are fully accounted for in the federal Renewable Fuel Standard. Including indirect impacts is critical for a U.S. biofuel policy based on sound GHG criteria that account for full production impacts.

The outcome will also have significant long-term implications both within and beyond the biofuels sector. Federal policy cannot effectively address global issues such as climate change if it fails to acknowledge that actions taken within our borders have global repercussions. Including measurement of indirect impacts of biofuels in federal policy will send a strong signal that the United States is committed to fully accounting for the global environmental impacts of its domestic policies.