

1. Define: incentive, benchmark, hectare, mitigate, "big lie," deforestation, arable, disclaim, mandate, tariff, murky
2. Translate from British English to American English: maize, petrol, row.
3. Why does increased use of maize for ethanol push maize prices up? (Hint: How does ethanol production affect overall demand for maize?) How do farmers respond to these price increases?
4. What are the negative consequences of increasing the amount of land used for maize production?
5. Explain why it would take 167 years before increasing ethanol production would actually decrease total carbon dioxide emissions.
6. If ethanol production increases CO2 emissions in the short-run, but decreases them in the very long run, does this mean that ethanol is worthwhile over all? Why/why not?
7. What is the Renewable Fuels Association (RFA)? What are the differences between RFA's message to the general public, to the media, and to Congress?
8. Are American farmers responsible for deforestation in other countries? Is U.S. ethanol policy responsible for this? Explain.
9. Why does Congress try to "pick green winners"?
10. What would happen to green technology if Congress did not pick winners?

Maized and confused

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Does ethanol in Iowa cause deforestation in Brazil?

HOW green is ethanol? The [Renewable Fuels Association](#) (RFA), an American lobby for the stuff, obviously wants voters and politicians to think it is very green indeed. The association's cool-coloured website plays down claims that ethanol may actually harm the environment. The biggest target of those claims these days is that growing maize to make ethanol causes indirect changes in land use by altering the incentives of other, often foreign, farmers.

Adding ethanol to the traditional markets for maize (food and fodder) inevitably pushes the price up. That encourages farmers, including those in poor countries, to boost production. If some of those farmers plough up savannah or cut down forest to grow the extra crops, the carbon dioxide released from the plants destroyed and soil ploughed up reduce the benefits of substituting the ethanol produced for petrol. If forests that are still growing are cleared, the environment loses the effect of their future uptake of carbon dioxide, too.



The [benchmark paper](#) on this, published in Science in February 2008, argues that, if such changes in land use are taken into account, ethanol is twice as carbon-intensive as petrol in the short run. Making ethanol and burning it in a car (without land changes) emits 20% less carbon dioxide than refining and burning petrol. But planting a hectare of ethanol causes someone to clear land for food crops elsewhere. That ethanol crop must provide that modest 20% reduction for 167 years to achieve a net carbon reduction. By then, of course, it is far too late to mitigate climate change.

Bob Dinneen, the RFA's head, calls these worries "crying wolf" and a "big lie". A video on the association's home page has a narrator, brow furrowed, looking puzzled while explaining land-use concerns—how could ethanol cause deforestation "halfway around the world"?—while the text on screen says flatly that ethanol has "no impact on rainforests". In more sober language, the RFA says that crop yields will increase to meet the maize diverted to ethanol, and points to United Nations' estimates that there are still billions of hectares of unused arable land around the world.

The latest row is over an [investigation](#) by America's Environmental Protection Agency (EPA) into the question of land-use changes. In June, the RFA asked for the EPA's data and models so that it could attempt to replicate any study that assigned land-use-change carbon to ethanol's overall green "score". The EPA provided spreadsheets, but the RFA shot back last week that it still did not have the models that brought the data together, and that it wants to run its own sensitivity analysis.

Despite Mr Dineen's hot language, it is clear that some changes of land-use are happening, but Mr Dineen argues that deforestation thousands of miles from American shores should not be pinned on Midwestern farmers. Is he right?

Perhaps, in a narrow moral sense. The American farmer can understandably disclaim responsibility for what a Brazilian logger does. But the RFA's attitude borders on being in denial. Crop yields almost certainly cannot increase fast enough to make up for the diverted maize, and any tilling of virgin land does release carbon dioxide in large quantities.

As much as the ethanol lobby claims to be surrounded by deceitful enemies (among them the oil industry), it is in fact protected by powerful congressmen. Indeed, existing mandates for ethanol production look set to get bigger in climate-change legislation coming through America's Congress. The House of Representatives' agriculture committee stripped changes in land use from consideration in the American Clean Energy and Security Bill that is now

under scrutiny there, at least pending further study. Now the RFA looks as if it may want to muck about with that study. Asking for the EPA's models so it can run its own sensitivity analysis could be a way to run a blizzard of competing numbers past congressmen who are not scientifically equipped to tell who is right.

A bigger problem, though, is the unstoppable desire of politicians to pick green winners—and not necessarily for green reasons. Ethanol, like “clean coal”, has a habit of being among them not because of its inherent virtues, but rather its political geography. Maize grows in crucial states, some of them “swing” states like Iowa and Ohio. Barack Obama thus recently renewed his support for American, maize-based ethanol. Letting Brazilian ethanol, made from sugarcane, into the market tariff-free would be cheaper and probably greener. But that, of course, is not on. Eventually, new crops such as switchgrass and new technologies that allow whole plants to be converted into ethanol, rather than just their sugar- or starch-rich parts, will change the equation by boosting yields. In the meantime, the truth about ethanol is murky.

http://www.economist.com/world/international/displaystory.cfm?story_id=14205727