1.The Trouble With Biofuel

2. The Case Against Biofuels

NOTE: Despite strong evidence that growing food crops to produce "biofuels" is seriously harming both the environment and the world's poor, the Obama administration is backing big subsidies and programmes that are boosting their use.

The decision by the European Union to obtain 10% of all transport fuels from "biofuels" by 2020 is proving equally disastrous for poor countries - see: http://www.guardian.co.uk/environment/2010/feb/15/biofuels-food-production-developing-countri

es

But while "biofuels" are a disaster for the environemntg and the world's poor, they are a massive shot in the arm for the biotech indusrtry and big agribiz.

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## **1.The Trouble With Biofuel** Eli Witek CHEM 111, March 15 2010 http://baptizemeinwine.livejournal.com/7412.html

Biofuels are problematic not only because the process may use sources of food in a time when people go hungry, and may actually take more net energy to produce than traditional fuels (two common criticisms), but because, fatally, a handful of multinational corporations (in particular the biotech agriculture industry) have a monopoly over the market. The oligopoly controls the two main sources of the sugars necessary for the seemingly most viable biofuel, bioethanol: corn and sugarcane. Biotech agribusiness can patent plant genetic material-- i.e. seeds--

enabling a few huge companies to control all corn and sugarcane production, which has resulted in genetically modified monocultures that require pesticides and fossil fuel based fertilizers, conveniently made by the same handful of corporations.

Currently, according to the Erosion, Technology, and Concentration Group (which examines the socioeconomic effects of biotechnologies) three companies control 39% of the world market of seeds, and 44% of seeds under intellectual property: Monsanto, Dupont-Pioneer, and Syngenta. Monsanto alone controls 90% of all genetically modified seeds. According a Washington Post article published November 29th, 2009 they are responsible for 93% of all soybeans produced in the U.S. and 80% of all corn. Some perspective on corn production in the U.S. is necessary to fully understand why these statistics currently make biofuel a nightmare proposition.

Corn is in the particular position of being a steadily increasing crop that, paradoxically, farmers sell at a dollar less than what it costs them to grow. Farmers rely on government subsidies to make up the difference; the Farm Subsidy Database calculates "..Corn subsidies in United States totaled \$56.2 billion from 1995-2006." And yet, farmers are forced to squeeze more and more bushels of corn per acre than ever before, creating a flood of cheap corn, mostly from Monsanto's GMO seeds.

Monsanto, a one-time manufacturer of napalm and Agent Orange, controls these GMO seeds, modified to withstand the insecticide Roundup that they manufacture. Farmers who once saved their seeds over generations now buy their seeds (and pesticides) from Monsanto. Those that do not are vulnerable to lawsuit for patent infringement from seeds that blow into their fields. Even if they have not violated any laws, Monsanto, who can afford it until the farmer is bankrupt, can indefinitely prolong a lawsuit.

The GMO corn and soybeans owned by Monsanto function as raw materials in an industrial food system that obscures what we eat from where it came from. As chronicled by authors like Michael Pollan (The Omnivores Dilemma) and Eric Schlosser (Fast Food Nation), the majority of surplus cheap corn is found in our food, where items are overly processed, allowing corporations like Cargill and Archer Daniels Midland to siphon away direct profit from the farmer, now less than 1% of the total U.S. population. The meat we eat is by virtue of corn: the industrial meat industry cost effectively feeds chickens and pigs corn as well as salmon and cows (grass eaters). The vast, seemingly irrational state of affairs has been underwritten by the U.S. government for the sake of private profit of agribusiness aristocracy. When the government subsidizes the farmer, they really enable increasing earnings and control for a few private businesses. The U.S. government also subsidizes the sale of ethanol, another boon to the companies.

One of the problems with conceptualizing the argument as food or biofuel is that the same corporations have a firm grip over both. Biofuels in this context are just another way agricultural corporations manipulate a demand for excess crops. The U.S. is the world's largest producer of ethanol, mostly produced by corn. (Renewable Fuels Association) Clearly, Monsanto has good reason to be heavily invested in biofuel production. In 2007 they entered a 1.5 billion dollar partnership with the German company BASF Ag, the largest chemical company in the world, with the aim of expanding GMO crops to supply the increasing demand for biofuels. (Monsanto.com)

The push for corn as a source of biofuel is not because it is a green alternative, but because that is what the corporations want. Monsanto is just one example of powerful corporate interest (corn is just one example of biomass they are invested in): Syngenta, DuPont, Dow Chemical, Novartis, Tyson (who allied with oil company Conoco-Philips to produce biodiesel from animal fat) ConAgra, Cargill, Archer Daniels Midland, are just some of the predatory businesses that have converged on biofuel. Biomass as fuel is a problem in a capitalist and oligopolistic market, where powerful companies can patent plant material—patent biomass, essentially---and promote it as a green alternative in fuel to the detriment of people and the environment. Biofuel is touted in a redux of the environmental crisis in 20th century brought about by toxic chemicals and "a better living through chemistry" (DuPont's one-time motto). Biofuel from bioengineering may seem like a plausible solution, but the leaders in biotechnology are the big corporations.

How actually green, how efficient is bioethanol? First of all, "...growing corn to produce ethanol, according to a 2007 study by the U.S. National Academy of Sciences, consumes 200 times more water than the water used to process corn into ethanol." (http://e360.yale.edu/content/feature.msp?id=2251) And according to Michael Pollan,

"...(Corn) consumes tremendous quantities of fossil fuel. Corn receives more synthetic fertilizer than any other crop, and that fertilizer is made from fossil fuels — mostly natural gas. Corn also receives more pesticide than any other crop, and most of that pesticide is made from petroleum." (http://pollan.blogs.nytimes.com/2006/05/24/the-great-yellow-hope/#more-24)

The idea that growing crops out of fossil fuels which you can then make into biofuel to replace fossil fuels is an absurd proposition generated by our agricultural paradox: lots of corn that costs more to make than it is worth.

And are these GM crops even safe?

"In what is being described as the first ever and most comprehensive study of the effects of genetically modified foods on mammalian health, researchers have linked organ damage with consumption of Monsanto's GM maize."

(http://foodfreedom.wordpress.com/2010/01/01/three-approved-gmos-linked-to-organ-damage/)

The consequences of monopoly control are by no means limited to the United States. The corporations are multinational, and have the ability to manipulate the global market with far-reaching impact. In a globalized context, corporations like Monsanto have undermined the self-sustainability of local economies. Weighing in on the food or fuel debate, Monsanto claims "...there is virtually no connection to biofuels and these unfortunate shortages around the globe" (Monsanto.com). But according to a leaked report from the World Bank, "...biofuels have forced world food prices up by 75%"

(http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy).

While, as Michael Pollan writes in The Omnivores Dilemma "...Since the Nixon administration, farmers in the United States have managed to produce 500 additional calories per person every day (up from 3,300, already substantially more than we need)" (103), the number of people who chronically go hungry has exceeded 1 billion. (U.N. World Food Programme) Food shortages, oil price spikes and biofuel demands have only benefited the corporations: the social justice non-governmental organization GRAIN reports "...for 2007, Cargill's profits increased 36%; Archer Daniels Midland's by 67 %; ConAgra by 30%; Bunge's by 49%; and Dreyfus's profits in the last quarter of 2007 grew by 77%. Monsanto's profits increase was 44% over 2006 and Dupont-Pioneer's 19%." (http://alainet.org/active/23996)

Empirical science ignores the larger context of biofuel creation and is open to some degree of manipulation. Private biotech companies fund and present research as they see fit (which is why we hear about the energy efficiency of converting corn to ethanol, and not the extreme inefficiency in the process of growing corn). When agribusinesses successfully lobby the government to promote ethanol, they are bending public perception away from the very serious issues concerning the larger picture of biofuel production in the current situation; namely, biofuels will only benefit them.

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2.The Case Against Biofuels: Probing Ethanol's Hidden Costs

## C. Ford Runge Yale Environment 360, 11 March 2010 http://www.reuters.com/article/idUS312668676120100311

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In light of the strong evidence that growing corn, soybeans, and other food crops to produce ethanol takes a heavy toll on the environment and is hurting the world's poor through higher food prices, consider this astonishing fact: This year, more than a third of the U.S.'s record corn harvest of 335 million metric tons will be used to produce corn ethanol. What's more, within five years fully 50 percent of the U.S. corn crop is expected to wind up as biofuels.

Here's another sobering fact. Despite the record deficits facing the U.S., and notwithstanding President Obama's embrace of some truly sustainable renewable energy policies, the president and his administration have wholeheartedly embraced corn ethanol and the tangle of government subsidies, price supports, and tariffs that underpin the entire dubious enterprise of using corn to power our cars. In early February, the president threw his weight behind new and existing initiatives to boost ethanol production from both food and nonfood sources, including supporting Congressional mandates that would triple biofuel production to 36 billion gallons by 2022.

Congress and the Obama administration are paying billions of dollars to producers of biofuels, with expenditures scheduled to increase steadily through 2022 and possibly 2030. The fuels are touted by these producers as a "green" solution to reliance on imported petroleum, and a boost for farmers seeking higher prices.

Yet a close look at their impact on food security and the environment - with profound effects on water, the eutrophication of our coastal zones from fertilizers, land use, and greenhouse gas emissions - suggests that the biofuel bandwagon is anything but green. Congress and the administration need to reconsider whether they are throwing good money after bad. If the biofuel saga illustrates anything, it is that thinking ecologically will require thinking more logically, as well.

Investments in biofuels have grown rapidly in the last decade, accelerating especially in developed countries and Brazil after 2003, when oil prices began to climb above \$25 per barrel, reaching a peak of \$120 per barrel in 2008. Between 2001 and 2008, world production of ethanol tripled from 4.9 billion gallons to 17 billion gallons, while biodiesel output rose from 264 million gallons to 2.9 billion gallons. Together, the U.S. and Brazil account for most of the world's ethanol production. Biodiesel, the other major biofuel, is produced mainly in the European Union, which makes roughly five times more than the U.S. In the EU, ethanol and biodiesel are projected to increase oilseed, wheat, and corn usage from negligible levels in 2004 to roughly 21, 17, and 5 million tons, respectively, in 2016, according to the Organization

for Economic Cooperation and Development.

In the U.S., once a reliable supplier of exported grain and oilseeds for food, biofuel production is soaring even as food crop export demand remains strong, driving prices further upward. Government support undergirding the biofuels industry has also grown rapidly and now forms a massive federal program that may be good for farm states, but is very bad for U.S. taxpayers.

These subsidy supports are a testament to the power of the farm lobby and its sway over the U.S. Congress. In addition to longstanding crop price supports that encourage production of corn and soybeans as feedstocks, biofuels are propped up by several other forms of government largesse. The first of these are mandates, known as "renewable fuels standards": In the U.S. in 2007, energy legislation raised mandated production of biofuels to 36 billion gallons by 2022. These mandates shelter biofuels investments by guaranteeing that the demand will be there, thus encouraging oversupply.

Then there are direct biofuel production subsidies, which raise feedstock prices for farmers by increasing the price of corn. In the U.S., blenders are paid a 45 cent-per-gallon "blender's tax credit" for ethanol - the equivalent of more than \$200 per acre to divert scarce corn from the food supply into fuel tanks. The federal government also pays a \$1 credit for plant-based biodiesel and "cellulosic" ethanol.

Finally, there is a 54 cent-per-gallon tariff on imported biofuel to protect domestic production from competition, especially to prevent Brazilian sugarcane-based ethanol (which can be produced at less than half the cost of U.S. ethanol from corn) from entering U.S. markets. These subsidies allow ethanol producers to pay higher and higher prices for feedstocks, illustrated by the record 2008 levels of corn, soybean, and wheat prices. Projections suggest they will remain higher, assuming normal weather and yields.

The rapid increase in grain and oilseed prices due to biofuels expansion has been a shock to consumers worldwide, especially during 2008 and early 2009. From 2005 to January 2008, the global price of wheat increased 143 percent, corn by 105 percent, rice by 154 percent, sugar by 118 percent, and oilseeds by 197 percent. In 2006-2007, this rate of increase accelerated, according to the U.S. Department of Agriculture, "due to continued demand for biofuels and drought in major producing countries." The price increases have since moderated, but many believe only temporarily, given tight stocks-to-use ratios.

It is in poor countries that these price increases pose direct threats to disposable income and food security. There, the run-up in food prices has been ominous for the more than one billion of the world's poor who are chronically food-insecure. Poor farmers in countries such as Bangladesh can barely support a household on a subsistence basis, and have little if any surplus production to sell, which means they do not benefit from higher prices for corn or wheat. And poor slum-dwellers in Lagos, Calcutta, Manila, or Mexico City produce no food at all, and spend as much as 90 percent of their meager household incomes just to eat.

But the most worrisome of recent criticisms of biofuels relate to their impacts on the natural environment. In the U.S., water shortages due to the huge volumes necessary to process grains

or sugar into ethanol are not uncommon, and are amplified if these crops are irrigated. Growing corn to produce ethanol, according to a 2007 study by the U.S. National Academy of Sciences, consumes 200 times more water than the water used to process corn into ethanol.

In the cornbelt of the Upper Midwest, even more serious problem arise. Corn acreage, which expanded by over 15 percent in 2007 in response to ethanol demands, requires extensive fertilization, adding to nitrogen and phosphorus that run off into lakes and streams and eventually enter the Mississippi River watershed. This is aggravated by systems of subterranean tiles and drains - 98 percent of Iowa's arable fields are tiled - that accelerate field drainage into ditches and local watersheds. As a result, loadings of nitrogen and phosphorus into the Mississippi and the Gulf of Mexico encourage algae growth, starving water bodies of oxygen needed by aquatic life and enlarging the hypoxic "dead zone" in the gulf.

Next is simply the crop acreage needed to feed the biofuels beast. A 2007 study in Science noted that to replace just 10 percent of the gasoline in the U.S. with ethanol and biodiesel would require 43 percent of current U.S. cropland for biofuel feedstocks. The EU would need to commit 38 percent of its cropland base. Otherwise, new lands will need to be brought into cultivation, drawn disproportionately from those more vulnerable to environmental damage, such as forests.

A pair of 2008 studies, again in Science, focused on the question of greenhouse gas emissions due to land-use shifts resulting from biofuels. One study said that if land is converted from rainforests, peatlands, savannas, or grasslands to produce biofuels, it causes a large net increase in greenhouse gas emissions for decades. A second study said that growing corn for ethanol in the U.S., for example, can lead to the clearing of forests and other wild lands in the developing world for food corn, which also causes a surge in greenhouse gas emissions.

A third study, by Nobel-Prize winning chemist Paul Crutzen in 2007, emphasized the impact from the heavy applications of nitrogen needed to grow expanded feedstocks of corn and rapeseed. The nitrogen necessary to grow these crops releases nitrous oxide into the atmosphere - a greenhouse gas 296 times more damaging than CO2 - and contributes more to global warming than biofuels save through fossil fuel reductions.

Thus have biofuels made the slow fade from green to brown. It is a sad irony of the biofuels experience that resource alternatives that seemed farmer-friendly and green have turned out so badly.

What's needed are a freeze on further mandates to slow overinvestment, reductions in the blenders' tax credit - especially when corn prices are high - and cuts in tariff protection to encourage cost-reduction strategies by U.S. producers. And the high environmental and human costs of using corn, soybeans, and other food crops to produce biofuels should spur government initiatives to develop more sustainable forms of renewable energy, such as wind power, solar power, and - one day, perhaps - algal biofuels grown at waste treatment plants.

Yet sadly, as in so many areas of policy, Congress and the administration prefer to reward inefficiency and political influence more than pursuing cost-effective - and sustainable - energy

strategies.

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