

The Future of Bio-fuels and the Limitations of Corn-based Ethanol (CBE)

Prof. Neil D. Hamilton, Drake University Law School, Des Moines, Iowa

January 2, 2008 – prepared for the 2008 AALS Conference, New York City

A. Inherent Problems with corn based Ethanol

In light of the somewhat skeptical attitude toward ethanol commonly encountered among agricultural law academics and those in environmental policy, this discussion will start by reviewing what are commonly recognized as some of the most significant concerns about the wisdom of the “all ethanol all the time” policy our nation appears to have adopted.

1. Cost – the amount of subsidies required to produce it and support its use raise real questions about its efficacy and potential as any more than a minor part of the answer to our energy needs. We are spending billions on it and the financial expectations do not appear to be transitional.
2. Quality as an alternative energy source – CBE is only marginally a “renewable” fuel as reflected in the calculations needed to achieve a positive energy balance for its production. Given everything it takes to produce – and distribute it – it is not the base for a truly renewable energy future. Even if we devoted every acre of corn to its production it would generate less than 15% of current fuel needs. The reality is we appear to have moved from ethanol being a Midwestern novelty e.g. the old days of gasohol, to it being a pillar of future energy policy without really thinking about its potential or the impact of doing so. Compared to other types of renewable fuel such as cellulosic ethanol or sugar-based ethanol CBE falls short.
3. Environmental impacts- the currently unsustainable methods of increasing corn and ethanol production – increased nitrogen use, planting continuous corn, expanding production onto marginal lands, and increased water usage – all raise significant questions about its impact on the environment and the countryside. At current rates of erosion we lose over 20 pounds of soil in Iowa for each gallon of ethanol produced and use at least 3.5 gallons of water.
4. Dislocating effects on food and agriculture system – the increased use of corn for ethanol has contributed to a variety of effects from rising food prices due to higher ingredient costs, tighter supplies for other commodities such as soy beans and wheat as more acres are pulled into corn production, higher feed costs for livestock producers, and reduced food aid shipments due to higher costs. These effects have contributed to a push back and growing concerns about ethanol, perhaps best highlighted by the U.N. official who declared use of corn for fuel as being a crime against humanity. As might be expected this assessment drew rapid and rabid response from ethanol’s defenders (and beneficiaries).
5. Impact on rural economies – while ethanol is being touted as a boon for rural communities and the economic infusion that will save rural America the reality is less clear. There are definitely winners – the farmers who built the first ethanol plants have reaped significant gains, the value of most farmland has increased rapidly and prices for most grains have reached record prices – helping fuel record farm incomes. But these economic gains are not evenly spread across rural America or even the farm community, and while the employment gains for

workers in ethanol plants are real the number of jobs actually created is modest. Weighed against these gains are the negative effects – including higher feed costs for livestock and the environmental impacts of expanding corn production on marginal lands. Perhaps an even greater worry are the very real economic risks faced by farmers and other more recent investors in new ethanol plants which may never be profitable unless Congress continues to extend the heavy federal subsidies propping up demand for ethanol.

6. Impact on public policy – ethanol has been very seductive for U.S. politicians. As a new “home grown” energy source it has attracted significant financial subsidies and other forms of public supports. While there may be criticisms, the basic response from supporters is that every gallon of ethanol we produce is one we don’t have to import from potentially hostile suppliers overseas. Couple this idea of “energy independence” with the belief supports for ethanol are supports for the American farmer and rural communities and you have an almost irresistible issue. This reality is reflected in the recent actions and statements of presidential candidates in Iowa. It is also born out most specifically in the recently enacted energy bill increasing the mandate for use of biofuels like ethanol and in the evolving 2007 farm bill which continues strong support for development and research in this area.

B. Ten Reasons Why Ethanol is Important for Agriculture and the U.S.

While the criticisms of ethanol are fairly well known and not insignificant, to understand the political power of the development and its attraction to rural communities it is important to acknowledge the positive dimensions of the policy. These include the following ten factors:

1. It has enlisted agriculture, rural communities and our land resources in America’s energy debate – with other opportunities still to be developed, such as wind.
2. It has increased grain prices for farmers and helped increase net farm income to record levels, which have contributed to the stability of the farm sector. In doing so it creates the opportunity to consider reducing other federal price supports.
3. Demand for corn has helped drive farmland prices to record levels and given new importance to agricultural land. The increased value and recognition should lend potential support for soil conservation and farmland preservation initiatives.
4. Development of locally owned ethanol facilities has created new profitable businesses many of which have yielded significant returns to early investors.
5. Rapid growth in ethanol production has fueled a boom in construction and demand for equipment and other technologies used in facilities, resulting in an economic surge that goes well beyond agriculture.
6. Local financing of ethanol facilities has showed it is possible to unlock the capital and wealth present in rural America (both in land values and savings), an experience which can possibly be adapted for other rural investment activities.
7. Ethanol has created excitement and new optimism in rural America, traits that have been in short supply in recent decades, and is giving rural residents an opportunity to feel engaged in doing something important for the nation.

8. Development of ethanol facilities has created new employment opportunities in rural areas and allowed many farm kids who left, e.g., those who went to ISU to study engineering, the chance to come home, and helped others find ways to stay.
9. Strong interest in ethanol has spurred development of new technologies and processes and led to significant investments in research both by public entities and private businesses, and will yield inventions with value in other fields as well.
10. The attention to ethanol has fueled interest in other alternative and renewable energy sources, most notably the development of cellulosic ethanol and wind.

C. How Ethanol Development in the U.S. Parallels Other International Environmental Challenges in Exploitation of Agricultural Lands

Development of ethanol in the U.S. provides an opportunity to consider other examples of natural resource exploitation in agrarian cultures happening elsewhere, e.g. the cutting of Indonesian rain forests to plant palm oil and the rapid desertification in China. Thinking about these connections raises the question - are these adverse environmental impacts a traditional product of agrarian based land dependent cultures? Consider these factors and similarities between the situations in the “advanced” U.S. agricultural sector and those in developing nations:

- the economic “opportunity” or domestic economic need leads to farmers placing new environmental demands on farmland and environmental resources such as water and soil. To use Leopold’s phrasing the demand for ethanol (or export commodities) is an excuse “to pump the well harder.”
- There is a relative lack of law or regulations that protect the resources or that place limitations on the actions of producers (or a lack of political willingness to enforce the existing laws).
- National and local governments are slow or unlikely to act to protect the resources because the government is either supporting the production in question or is directly endorsing or encouraging it (and benefiting from it).
- Farmers and the companies involved don’t want to stop the activity or lose out on the opportunities, at least in the near term, because of the increased prices and incomes they present.

The production cycles and processes in these various countries are interrelated, e.g., increased demand for biofuels in Europe leads to increased production of palm oil in South Asia, and the global marketplace for commodities completes the connection so you have more soil erosion in China to increase food exports to the U.S. which is using more of its land to grow corn to produce ethanol to help meet the demand for higher cost fuels which is driven in part by the increased demand in China.

D. The Future of Ethanol

The future of ethanol is subject to many variables making it difficult to predict what the next few years will bring. That said here are some observations on what might happen:

1. Already there is somewhat of a shakeout period happening in construction and ownership of ethanol plants as price fluctuations and corn supply issues have led to consolidation of existing plants and delays or termination of plans to build new ones. However the new energy bill could give a new boost to plant construction, as will continued high oil prices.
2. The “promise” of cellulosic ethanol technology is frequently reported to be “5 to 10 years” away. This most likely means it will be 10 years or more and could be even further. The truth is we don’t know and haven’t thought it out – at least as to the practical impacts of the technology in rural areas. The reality may be the technology for CE will never emerge on a commercial scale.
3. The material handling and technological challenges of CE appear to be immense – and little discussed. But the impracticality of moving huge volumes of low energy bulk materials long distances to be used for lengthy fermentation processes appears to be illogical from an energy production perspective. The idea of moving the whole field not just the corn to town is incredible.
4. Current ideas for near term CE plants such as the Poet plant in Emmetsburg Iowa intend to use corn cobs and possibly corn stover for fuel. While these resources may be considered as excess waste products the reality is crop residues play a critical though underappreciated role in maintaining soil fertility and quality. At a time when fertilizer costs are at record levels the “in place” value of these residues and their costs as a fuel stock become more significant.
5. While the public policy debate about ethanol expansion was bogged down it has now moved forward with action on the energy bill and the 2007 farm bill, however, legitimate public policy issues remain. Three issues in particular will present continuing challenges: the costs of subsidies; the availability of lower cost and higher value alternatives, such as ethanol from Brazilian sugar cane; and the domestic food supply, food as fuel and feed cost concerns.
6. Depending on how these various concerns develop the possible outcomes could include; a slowing in the expansion of ethanol capacity, the closing of smaller scale plants, the softening of farm land markets, and the appearance of the first financial problems relating to the ownership of ethanol plants.

On the other hand if the ethanol boom continues you may see the opposite with continued construction of ethanol plants including expansion into areas without existing corn supplies, such as California, Georgia, and New York requiring imports of corn by rail. In addition continued increases in farmland values can be predicted, for example a clean 160 acre tract in Jasper County Iowa sold at the end of 2007 for \$7100 per acre.