The Economics of Biofuel Supply Chains

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Stuart Smyth
University of Saskatchewan

Outline

- Introduction to GE³LS research in Canada
- Present situation of GE³LS research
- Biofuel supply chain challenges in Canada
- Relativity of issues for Europe
- Observations

Introduction to GE³LS

- Stands for: Genomic, Economic, Environmental, Ethical, Legal and Social
- Compares to the ELSA research in the EU
- Started in 2001 as a collaboration between the Universities of Sask., Alberta & Calgary
- Initial project was funded by Genome Canada for 4 years

Evolution of GE³LS research

- The most recent round of Genome Canada funding required all S&T applications to have an imbedded GE³LS component
- The concept has been taken up by other federal funding programs (e.g. ABIP)
- Trend is towards increasing integration of natural and social sciences in Canada

Biofuel Supply Chain Challenges in Canada

- The major challenge is one of a spatial nature
- Abundance of biomass in the Prairie provinces however, the end market is thousands of miles away
- Transportation routes are not designed to distribute biofuels to Eastern Canada, but to the American midwest

Economic barriers in Canada

- In Western Canada, supply of biomass exceeds demand for biofuel
- In Eastern Canada, potential demand for biofuel is greater than available biomass
- Rubber, rail and pipeline not options
- Substantial geographic barriers exist to the development of this industry in Canada

Biomass in Europe

- Biomass capacity exists in Canada, US, Brazil, Argentina and Australia
- Farmers need to retain ⅓ of post-harvest residues
- Farmers willing to sell ⅓ to ½ of post-harvest residues
- Eastern side of Germany is the only location that has a supply of biomass

Economic Challenges in Europe

- Inability to apply GM techniques
- Rigorous environmental legislation
- Population density of 117/km² vs. 3/km² in Canada
- Market dominance of organic production
- Marginal or under-utilized land availability is limited

European Economics of Biofuels

- Large population that is more supportive of green technologies, hence higher demand
- Lack of biomass supply
- Unknown trade-offs between continuous biomass cropping and soil nutrient loss
- Will demand for organics spill-over to biofuels

Economics of Ethanol

- NREL in the US does research on all forms of renewable energy except ethanol
- The US is unable to ship ethanol within the country and the California rail system is not configured to 100 car unit trains
- Brazil can ship ethanol to Montreal cheaper than Western Canada can

Observations

- Literature is suggesting that the environmental footprint of producing ethanol is greater than the benefit of using it as a biofuel
- Matching supply with demand seems to be problematic in both Europe and North America

Observations con't

- Land is available to produce biomass without it being diverted away from food/feed production
- A major issue that has not been address at a global level is whether the technology of using crop agriculture to produce biomass makes sense in developing countries?