Potential for a Sustainable Feedstock Supply: Agriculture & Forest Resources

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Sustainability

• Elements
  – Economic
  – Social
  – Environmental

• Driving Variables
  – Prices
  – Investment
Long term trend in agricultural commodity prices

30+ years of declining and or flat prices

Public Spending in Agriculture has stagnated and it is the least where it is needed the most.
Global Anthropogenic GHG Emissions

(a) Global annual emissions of anthropogenic GHGs from 1970 to 2004. (b) Share of different anthropogenic GHGs in total emissions in 2004 in terms of CO₂-eq. (c) Share of different sectors in total anthropogenic GHG emissions in 2004 in terms of CO₂-eq (Forestry includes deforestation.)

GHG for ag and forestry is to address the 31% of annual emissions coming. If we take care of this we take care of 0.26% Searchinger, et al.
The Story:

- Agricultural commodity prices went from depressed to walking on a “razor’s edge”
- Biofuels were “the straw that broke the camel’s back”
- Current industrial agricultural system is not sustainable; biofuels sustainability largely depend on the way feedstock are produced
The Question is

• Under which conditions biofuels can be an opportunity for:
  – Economic Development
  – Climate change / environmental benefit
  – Energy crisis / energy independence

• Increased Ag prices would drive new investment into agriculture
  – Type on investment matters. A LOT!
Increase in agricultural prices is not necessarily a bad for food security, specially if coming from long trend of low prices.
Trade-off Between Agricultural Prices and Environmental Cost

Under current agricultural practices and food consumption patterns, an increase in ag prices could accelerate environmental costs.
Expand the Impact of Higher Prices in Food Security

Investments directed to improve share of high prices capture by farmers would improve food security
Investment in agricultural technologies less intensive in fossil inputs, and in tune with local soil and food habits would reduce environmental cost of agriculture.
<table>
<thead>
<tr>
<th>Source</th>
<th>Reference Scenario 2022</th>
<th>Upper bound</th>
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<tbody>
<tr>
<td>Logging residues</td>
<td>20.1</td>
<td>40.1</td>
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<tr>
<td>Other residues</td>
<td>6.1</td>
<td>12.2</td>
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<tr>
<td>Thinnings from timberland</td>
<td>10.9</td>
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<td>Thinnings from other timberlands</td>
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<td>0</td>
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<tr>
<td>Primary mill residues</td>
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<tr>
<td>Urban wood residues</td>
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<td>Conventional sourced wood</td>
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<td>15.0</td>
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<tr>
<td>Total</td>
<td>44.7</td>
<td>102.8</td>
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</table>
Regional Forest Supply
(Reference Scenario – BRDI)
Forestland Biomass Supply
(BRDI Reference vs. POLYSYS)

Million dry tons

Roadside cost ($/dry ton)

$0

$20

$40

$60

$80

$100

0

50

100

150

200

BRDI

POLYSYS

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Cellulosic Supply Curve - 2022

[Graph showing the relationship between US$ / Dry ton and Million Dry tons over the range of 0 to 800 Million Dry tons, with values increasing as the tonnage increases.]
Cellulosic Supply Curve -2015
Increase Ag Productivity
Crop Prices vs. Cellulosic Price – 2015
Average vs. High Productivity

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Cellulosic Supply Curves - 2022
Increase Ag. Productivity
Crop Price vs. Cellulosic Price - 2022

Average vs. High Productivity

US$/bu. (corn and wheat) vs. US$/bu. (soybeans)

US$/Dry Ton

- Average Yield
- High Yield

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Concluding Remarks

- Biofuels could result in a massive transfer of resources to the ag sector.
- Biofuels provides the profitability to invest in agriculture and radically change what, how, and where we produce.
- Speed of expansion of biomass supply would have significant cross crop impacts.
- Forestry resources are key for the initial stage and for attenuating impacts of crop prices.
Thanks!

Bio-based Energy Analysis Group  
http://beag.ag.utk.edu/

Agricultural Policy Analysis Center  
http://agpolicy.org/

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