Farming the Bioeconomy
Connecting Sustainable Agriculture and the Green Economy

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What I will Cover Today

• Sustainable agriculture concerns and opportunities in the bioeconomy
• Examples of policy and market support for sustainable agriculture
• Recommendations for better connecting Green Building sector and sustainable farming
IATP works at the intersection of policy and practice to ensure fair and sustainable food, farm and trade systems for all people.

www.iatp.org
IATP’s Perspective on a Sustainable Bioeconomy

- Provides food, fuel, fiber and materials we need
- Safer products and processes
- Protects and enhances the environment and climate
- Benefits farmers, rural communities and society
- Is fair and responsive
• To spur the introduction and use of biomaterials that are sustainable from cradle to cradle;

• To advance the development and diffusion of sustainable biomaterials by creating sustainability guidelines, engaging markets, and promoting policy initiatives.

www.sustainablebiomaterials.org
My Perspective
Agricultural Feedstock Concerns

- Soil, water and air quality
- Fossil fuel and energy use
- Biodiversity and wildlife impacts
- Global warming concerns
- Farmer and farm worker safety and benefit
- Food security impacts
The Primary Feedstock of Today’s Bioeconomy
We’re *Planting* More and More…

**Corn and Soybean Planted Acreage - United States**

- Million acres

- Graph showing planted acreage from 1993 to 2013 with data points indicating trends over time.

- Blue line representing corn planted acreage.
- Red line representing soybeans planted acreage.

**U.S. Corn Areas Experiencing Drought**

- Reflects August 28, 2012
- U.S. Drought Monitor data

- Approximately 85% of the corn grown in the U.S. is within an area experiencing drought, based on historical NASS crop production data.

**U.S. Corn Production**

- Graph showing corn production from 2002 to 2012 with data points indicating production levels.

- Values on the y-axis range from 0.7 to 14.0 billion bushels.

**U.S. Soybean Production**

- Graph showing soybean production from 2002 to 2012 with data points indicating production levels.

- Values on the y-axis range from 2.4 to 3.6 billion bushels.

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Major and minor agricultural areas are derived from USDA county-level crop production data from 2001 to 2010. Additional information on these agricultural data can be found at: [http://www.nass.usda.gov/](http://www.nass.usda.gov/)

Merged drought areas are derived from the U.S. Drought Monitor product and do not depict the intensity of drought in any particular location. More information on the Drought Monitor can be found at: [http://www.drought.gov](http://www.drought.gov)
Why Grow So Much Corn?

- Cropping decisions and farming practices are driven primarily by economics.
- Agricultural economics are determined by policy and markets.
- Corn has been “deeply” invested in from both perspectives and provides multiple markets & risk mitigation tools.
From a Bushel of Corn...

31.5 lbs. of starch
or
33 lbs. of sweetener
or
2.8 gal. of fuel ethanol
or
22.4 lbs. of PLA fiber/polymer
plus
17.5 lbs. of distillers dried grains with solubles*
13.5 lbs. of gluten feed**
2.6 lbs. of gluten meal**
and
1.5 lbs. of corn oil**
Estimated 2012-13 US Corn Uses

- 39% Feed and Residual Use
- 39% Fuel Ethanol Use
- 14% High Fructose Syrup*
- 2% Sweetener Use*
- 1% Starch Use*
- 1% Cereal/Other Use*
- 3% Beverage Alcohol Use
- 1% Seed Use
- 1% Export Use

Source: USDA
Markets for Bioplastics are still small...

Global production capacities of bioplastics 2012 (by market segment)

Global production capacities of bioplastics 2017 (by market segment)

Source: European Bioplastics | Institute for Bioplastics and Biocomposites (December 2017)

Institute for Agriculture and Trade Policy
...But growing use does mean growing demand for feedstocks

**Land use for bioplastics 2012 and 2017**

- **Global land area**: 13.4 billion ha = 100%
- **Global agricultural area**: 5 billion ha = 37%

**GLOBAL AGRICULTURAL AREA**

- **Pasture**: 3.5 billion ha = 70%
- **Arable land**: 1.4 billion ha = 30%
- **Food & Feed**: 1.24 billion ha = 26%
- **Material use including Bioplastics**: 106 million ha = 2%
  - 2012: 0.4 million ha < 0.01%
  - 2017: 1.2 million ha ≈ 0.02%
- **Biofuels**: 53 million ha = 1%

*Source: European Bioplastics | Institute for Bioplastics and Biocomposites (December 2013) / FAO 2011

* In relation to global agricultural area
** Also includes approx. 1% fallow land
Food Security Concerns

- Increasing demand for crops for food and bioeconomy needs makes any new “demand” felt
- Issue of “food vs. fuel/bioplastic” is generally more about land use rather than specific crops
- That may change with the drought and volatile weather...

*Source:* World Bank DECPG.

*Note:* The Food Price Index weighs export prices of a variety of food commodities around the world in nominal U.S. dollar prices, 2005 = 100.
What We Put Into Corn...

– Average of over 120 lbs. Nitrogen fertilizer per acre (133-155 kg/ha)
– Among the highest levels of herbicide and pesticide use for conventional crops
– Irrigation water
– Proprietary hybrids
What Else is Produced

- Soil erosion and nutrient run-off and leaching
- Water, air, soil, health and biodiversity impacts of chemical and GMO use
- Greenhouse gas emissions
- Pressure on ecosystems and land uses
- Reduced rural economic benefit from agricultural production
It can be different!

Commodity crop production can be part of a sustainable farming system

But markets and policies need to support it
Green Economy as Answer

- Focused on renewability and environmental performance
- Has high enough value to “share” throughout the supply chain
- Production and systems can support (or even supplant) other policy costs and objectives

- Mandates increasing amount and variety of biofuel use
- Supports alternative feedstock development
- One of only U.S. policies with clear GHG criteria
Policy Support Examples: U.S.
USDA BioPreferred Program

- Created in 2002 Farm Bill
- Preferred procurement program for Federal agencies and their contractors
- Voluntary labeling program of biobased products

Policy Support Examples: U.S. 
Biomass Crop Assistance Program (BCAP)

• Created in 2008 U.S. Farm Bill
• Provides support to farmers to produce new feedstock crops
• Requires linkage to biorefining industry
Policy Support Examples: Minnesota

• Minnesota Model
  – Provided producer payments for in-state ethanol production
  – 1986-2013

• Bioeconomy Coalition
  – Next gen biofuels, biorefining and biomass heat producer payments
  – To be introduced in 2014 Legislative session
Policy Support Examples: Minnesota and Wisconsin

• Minnesota Biomass Harvesting Guidelines
• Minnesota Agricultural Water Quality Certification
• Wisconsin Biomass Planting & Harvest Guidelines
Market Support: International

- Growing number of international certification efforts around biomaterials
- Cover full lifecycle of production, including feedstocks
Market Support: U.S.

- Sustainable Biodiesel Alliance certification
- Working Landscapes Certificates
How to address feedstock sustainability concerns when...

- Industry is emerging
- Feedstock use is relatively low
- Costs are higher than fossil fuel competitors
• Enables bioplastic customers to support more sustainable farming and land use practices.

• Uses “offset” approach to address landscape impacts of feedstock production.

• Does not require “identity-preserve” infrastructure and additional transaction costs.
Corn Production Criteria

- No GMO varieties
- No continuous cropping
- Soil testing and fertilization according to state criteria and test results
- No use of known human or animal carcinogenic chemicals
- Use of cover crops or at least 70% of residues left in field
- WLC Farm Plan that includes biodiversity, GHG, pollinator protection and energy criteria
WLC Goals

• Farmers receive a higher and more stable price for sustainable production
• Expanded production of sustainable feedstocks
• Growth of markets for sustainable production
• Begin movement towards perennial biomass feedstocks
WLCs in the market

- 2010: Stonyfield became the first major WLC buyer
- 2011: Danone Germany begins participating
- 2012: Partnership with Nebraska Farmers Union
- Over 2000 acres of production in 2012 (equivalent to almost 1 billion yogurt cups!)
WLC = nonGMOplus

- Growing interest for non-GMO production
- WLC Criteria include non-GMO, but also address other core sustainability concerns
- WLC program and certification system can be developed/utilized for other crops (food and feed) and for farm rotations
- Strong connections to farmers and farm organizations interested in nonGMOplus production
Making the Shift to Biomass

Grasses, trees, and crop and forest residues are the “next generation” of feedstocks

- Higher potential environmental value
- Lower concerns about sustainability impacts (especially food security)

But markets, policies and infrastructure are needed
Making the Shift to Biomass

Benefits of biomass feedstocks are not guaranteed:

• If high production levels are goal, sustainability value is likely lower
  ▪ Fertilizer use
  ▪ Over harvesting
• Sustainable production and management systems are still required to ensure desired outcomes
Connecting to Green Building

*Look to the Woods*

Forest management certification required for multiple markets and policy

- FSC inclusion under LEED certification in US is biggest driver of certification/market
- Rapidly renewable/locally sourced would count
- What about ag sourced standard?
Connecting to Green Building

Look to Core Markets

Food Businesses

• What role is food in overall business LCA?
• Is it accounted for in LEED type certification?
• Example of IATP/Red Stag work
• Not easy!!
Thank you!

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