Sustainable at the Source: Sustainability Concerns and Opportunities for Biopolymer Feedstocks

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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
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
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
Most Common Bioplastic Feedstocks

- Sugarcane
- Potatoes
- Wheat
- Corn

Why?
Emerging Bioplastic Feedstocks

- Palm leaves and materials
- Grasses
- Bamboo
- Forest Residues

Why?
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…

**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.

- Major areas combined account for 75% of the total national production annually.
- Major and minor areas combined account for 99% of the total national production annually.

Map predisposition 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.droughtmonitor.org](http://www.droughtmonitor.org)
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
Estimated 2010-11 US Corn Uses

- Feed and Residual Use: 39%
- Fuel Ethanol Use: 14%
- High Fructose Syrup*: 3%
- Sweetener Use*: 1%
- Starch Use*: 2%
- Cereal/Other Use*: 1%
- Beverage Alcohol Use: 1%
- Seed Use: 1%
- Export Use: 0%

Source: USDA
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.
Market Support: Biospecs

Environmentally Preferable Purchasing Specifications for Compostable Biobased Food Service Ware

Support sustainable farming practices in the production of environmentally preferable biobased food service ware

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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
Thank you!

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