Support your local grass farmer:

Why a local bioenergy movement is needed and how to start one

As of January 30, 2008, there were about 38,000 Google results for "local food movement" and exactly zero Google results for "local bioenergy movement". It is time to fix that.

The idea of locally-grown food resonates with many people for a variety of reasons, including its relatively small carbon footprint. Grass-fed beef holds a place of honor in the local food movement. Modern agriculture's heavy reliance on fossil fuels is linked to separating cattle from grass and can be mitigated by allowing these ruminants to eat their natural diet and recycle nutrients through their droppings.

Michael Pollan's 2006 bestseller, The Omnivore's Dilemma, traces the alternative agriculture food chain from field to table. He draws a distinction between "Big Organic" (illustrated by Whole Foods Markets and its large suppliers) and smaller farms that sell their products locally.

Pollan's local organic food chain started with "a single polyculture of grasses growing at Polyface Farm in Swoope, Virginia." There, Joel Salatin, who calls himself a grass farmer, produces beef, pork, poultry, eggs, and sweet corn for sale through farmers' markets, buying clubs, and nearby stores and restaurants.

As the U.S. increases the amount of renewable energy coming from agriculture, a parallel distinction between "big bioenergy" and "local bioenergy" is useful. The former includes ethanol and biodiesel. The latter includes biomass burned to make electricity or heat buildings. Big bioenergy is getting bigger. Local bioenergy needs help to gain a foothold.

The energy bill signed into law in December 2007 contains mandates and subsidies to increase annual U.S. ethanol production from 7 billion gallons in 2007 to 36 billion by 2022. Most of the increase is expected to come from "cellulosic ethanol" made from waste wood, fast-growing trees, agricultural residues, and perennial energy grasses such as switchgrass and *Miscanthus*.

Numerous studies, including the report of the EPA Science Advisory Board Hypoxia Panel, address the environmental impacts of increased production of corn-based ethanol. In simple terms, higher corn prices lead to more acres of corn. That leads to loss of wildlife habitat and more nutrients and sediment in streams flowing to the Great Lakes and Mississippi River.

Scientists and policymakers view biofuels made from cellulosic feedstock as part of the solution to these problems. But this will take time. Technologies to convert cellulose into liquid fuel on an industrial scale at a competitive cost are still under development. Using corn stover and other crop residues will not reduce, and may worsen, adverse impacts on soil, water and biodiversity.

While the policy spotlight is on ethanol, some farmers and entrepreneurs are working to create a niche for local bioenergy from perennial energy grasses. They deserve our gratitude and support. Perhaps counter-intuitively, they deserve the support of corn growers and ethanol producers.

Here's why.

Biomass can be burned for power and heat with existing technology. Burning switchgrass along with coal has been successfully demonstrated at an Iowa power plant. At least two biomass-fueled power plants are planned in Illinois, including the Robbins Community Power plant in southern Cook County. Small businesses and farmer co-ops in Illinois and neighboring states are pursuing plans to make grass pellets and specially-designed stoves, furnaces and cooking grills to burn them. As with Joel Salatin's pastures, grass polycultures including native prairie plants can form the basis of a local bioenergy system.

This is where the biofuels industry can benefit from synergies with grass farmers.

Grasses planted on sloping soils and in stream buffers can reduce erosion, add carbon to the soil, keep nutrients lost from crop fields out of the streams, and provide wildlife habitat. Creating local markets for energy grasses will help mitigate environmental impacts of biofuels made from annual row crops. It will let early-adopter farmers start up the learning curve and acquire equipment for producing the biofuel feedstock of the future. It will engage entrepreneurs and engineers in improving methods to transport, densify, and process biomass – innovations that can help to make cellulosic biofuel production economically competitive.

Ethanol producers could jump-start a market for energy grasses by burning perennial biomass along with coal or natural gas to power their plants. This would not increase the amount of ethanol they produce. But it would improve ethanol's net energy balance by reducing the amount of fossil fuel consumed in producing each gallon of ethanol. Ethanol producers could even enter the pellet fuel market. If they decide to pelletize distillers grains for sale as either feed or fuel, the same equipment could be used to make grass pellets.

One provision of the new federal energy bill will provide loan guarantees and operating assistance grants to venture capital companies that invest in small renewable energy enterprises. Public policy can and should do more to encourage farmers to begin planting energy grasses. More research and development is needed on multifunctional agricultural systems designed to produce food, energy, and environmental benefits such as clean water and biodiversity.

Consumers who make the extra effort and willingly pay a premium for grass-based meat and dairy products are supporting a healthy landscape. Individuals, businesses, and institutions that buy energy derived from perennial grasses—or carbon offsets tied to substituting biomass for fossil fuels—will play a comparable role in the local bioenergy economy.

A local bioenergy roadmap

The concept of a local bioenergy movement—literally a *grass-roots* movement—emphasizes the essential role of farmers, landowners, and entrepreneurs in shaping the emerging bioeconomy, not merely reacting to policies from Washington and Springfield or decisions made in corporate boardrooms. A great transformation of the Illinois agricultural landscape began nearly a century ago when farmers including Charles Meharry of Tolono started planting soybeans (in 1909) and businessmen such as A. E. Staley of Decatur built industrial plants (in 1922) to process beans into food, feed and commercial products. Today, Illinois has an abundance of thinkers, do-ers, and risk-takers ready to become the pioneers of a 21st Century agricultural transformation.

Agriculture is much different today than it was in 1909 when Charles Meharry decided to plant 19 acres of soybeans. Science, technology, and the role of major corporations and public policy have an enormous influence on crop decisions and market economics. Yet, the land and the people who derive their livelihood from the land are still at the root of it all.

The federal energy bill applies a top-down model of change: set national targets for biofuel production and adopt a set of policies designed to meet those targets.

A bottom-up approach can and should be followed simultaneously at a much lower public cost.

A model of change developed and tested by the Green Lands, Blue Waters (GLBW) Consortium offers a bottom-up approach well suited to the expansion of biomass production and bioenergy enterprises in harmony with local landscapes and sustainable development.

The GLBW Consortium includes land grant universities (including the University of Illinois) and nongovernmental organizations (including the Agricultural Watershed Institute, AWI). GLBW develops new agricultural systems with more perennial plants and cover crops. Its vision is "to improve water quality in the Mississippi River Basin, increase economic options and profitability for farmers, improve wildlife habitat, reduce flooding potential, strengthen vitality and quality of life of rural communities, and enhance human health."

GLBW's model of change is designed to support farmers and farm enterprises. It draws on the knowledge and ideas of farmers, scientists, conservation organizations, government and business leaders, and other key stakeholders to expand uses and markets for perennial and cover crops.

A biomass energy project led by AWI represents the first Illinois demonstration of this model. The project report is available at www.agwatershed.org. It includes an energy grass roadmap focused on the Upper Sangamon watershed around Decatur, but readily adaptable to other areas.

Some of the roadmap elements are:

- Form an Energy Crop Council,
- Demonstrate co-firing and pelleting of energy crops,
- Establish local markets for energy crops,
- Conduct landscape-scale R&D on water quality and habitat benefits,
- Establish "green payments" for greenhouse gas reduction and other environmental benefits to help make production and use of perennial energy crops profitable,
- Support the creation and growth of small bioenergy enterprises.

Prudent investment of public funds can help ensure that Illinois farmers and entrepreneurs are at the forefront of the emerging bioeconomy. Done well, production and use of perennial energy grasses will pay large dividends for the economy and environment of Illinois and the nation.

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For further information, contact Steve John, Agricultural Watershed Institute, at (217) 877-5640 or sfjohn@agwatershed.org, or visit the AWI website, www.agwatershed.org. Portions of this discussion paper are adapted from "The Once and Future Prairie State" by Steve John, in the Winter 2007-2008 issue of *The Illinois Steward,* a quarterly magazine published by University of Illinois Extension.

A sampling of Local Bioenergy products, services, and concepts (compiled August 2008)

Pellet Pro's, located in Kewanee, IL, "was created with one basic idea in mind. We wanted to give the average person the ability to make their own renewable heat source from local inexpensive materials." The company sells a variety of small pellet mills and hammer mills, some electric, some diesel- or PTO-powered. Most models are priced under $5,000. www.pelletpros.com

BHS Energy, located in Wyoming, PA, "will soon have available for order an inexpensive manually-operated machine powered with a farm tractor PTO." The BHS "Slugger" is marketed to farmers or small businesses to produce biomass fuel for their own use or for sale." The "slugs" or "tablets" produced by the machine are 1.5" diameter by ¼" to 1" thick. www.bhsenergy.com

Jock Gill, a Vermont-based consultant, has organized a grass energy Google group and posted a concept paper and spreadsheet for a "Community-Supported Energy" model using the BHS Slugger. He estimates that grass from 238 acres could be processed into tablets to heat 73 homes (in Vermont) and generate $50,000 in annual salary + profit to the Tablet Production Center owner/operator. To join the group or read posted messages and files, go to http://groups.google.com/group/Grass-Energy?hl=en.

Big M Manufacturing, Taylorville, IL, (phone: 217/824-9372), makes corn-burning furnaces and boilers under the A-Maize-Ing Heat brand name. Last winter, a furnace and a boiler custom-designed by Big M to burn grass pellets were installed to heat the University of Illinois-Extension building in Taylorville. They are burning pellets of Miscanthus and switchgrass grown on U of I's Dudley Smith Research Farm.

University of Illinois has a major research initiative for energy grasses, with an emphasis on management and economics of Miscanthus. Some research and outreach activities (including the Big M Mfg. grass pellet heating system at the Christian County Extension building) address use of grasses for power and heat. Web sites: www.renewable-energy.uiuc.edu and www.miscanthus.uiuc.edu.

Chip Energy: A company in Goodfield, IL, manufactures and sells biomass cooking grills under the brand name Chip Energy. A biomass-fueled heating furnace is under development. Both products use "micro-gasification" technology to burn many types of biomass including wood pellets or chips, switchgrass or Miscanthus, corn, shredded paper, sawdust, or crop residues. www.chipenergy.com

Pike Pellets makes premium wood pellets from sawdust and sawmill waste at its new (2007) plant near Pittsfield, IL. Owner Greg Ketterman has done test runs using agricultural wastes and is considering commercial production of grass pellets. www.pikepellets.com

Power plants: Robbins Community Power near Chicago is going through the permit process to convert an existing waste-to-energy power plant to run on tree trimmings and clean construction debris. www.robbinscommunitypower.com **Jo-Carroll Energy**, an electric cooperative in northwest Illinois, announced plans—contingent on financing and other factors—for an 80 megawatt plant near Savanna that will burn renewable biomass such as waste wood, corn stover, and switchgrass. www.jocarroll.com

Show Me Energy Cooperative, located in western Missouri, is committed "to establish an innovative, profitable, leading model for production of biomass-based fuels [that] may be replicated across the country by small producer-owned cooperatives". www.goshowmeenergy.com

The Madelia Model: Rural Advantage, a nonprofit organization, envisions growing or collecting biomass, especially native grasses, within a 25-mile radius around Madelia, MN, to fuel a renewable energy facility. Payments for ecosystem services including carbon offsets, water quality, and wildlife habitat are anticipated to make perennial grass crop economically viable. www.ruraladvantage.org

This is only a small sample of "local bioenergy" enterprises. Mention of companies or products does not constitute an endorsement by the Agricultural Watershed Institute. AWI welcomes contacts from individuals and organizations engaged in—or considering—production, processing, or use of energy grasses. We have registered the URL "localbioenergy.org" and plan to develop it as a site for networking among biomass producers, enterprises, supportive organizations, and bioenergy consumers.