



# MIZZOU

The magazine of  
the Mizzou Alumni Association

[Home](#) » [Winter 2012](#) » [Features](#) » Fuel in the fields

## Fuel in the fields

### A new old source of power

Story by Brian Wallstin | Photo by Robert Lewellyn

In 1925, Henry Ford told *The New York Times* that a farmer could squeeze enough ethyl alcohol from an acre of potatoes in one year to power the machinery needed to cultivate the field for the next century.

“The fuel of the future is going to come from fruit,” he said, “like that sumac out by the road, or from the apples, weeds, sawdust — almost anything.”

Ford, whose early Model Ts ran on both ethanol and gasoline, also had a sentimental reason to favor alternatives to crude oil, which by the mid-1920s was cheaper to refine than ethanol. A champion of rural values who grew up on a farm, Ford believed American farmers wouldn’t survive unless they produced something in addition to food, and almost as valuable — energy.

Nearly a century later, tens of billions of dollars in government incentives and private investments have been spent on the science and technology of



Plants in floodplains along the Mississippi River corridor can become sources of fuel. Photo by Robert Lewellyn

converting plants into liquid fuel. Yet prospects for Ford's "fuel of the future" are still uncertain: Despite aggressive federal mandates to produce 250 million gallons of advanced biofuels in 2011, U.S. energy officials have been forced to lower this year's goal to as little as 6.6 million gallons. Advanced biofuels come from crops other than corn, which has dominated efforts to commercialize a sustainable alternative to gasoline since the 1970s.

The reasons for the disappointing output are the same supply-chain problems encountered by early 20th century proponents of ethyl alcohol: Who will grow the so-called energy crops, and what crops will be grown? Who will refine the crops into fuel, and what technology will produce the most energy at the lowest cost? How will the refined product be distributed, and who will use it?

With the help of a \$20,000 grant from Mizzou Advantage, Shibu Jose, director of MU's Center for Agroforestry, has established a comprehensive blueprint for a commercial biofuel industry. The Mississippi/Missouri River Advanced Biomass/BioFuel Consortium has about 50 partners, including land owners, researchers, conservationists, biorefineries and potential customers such as FedEx, which wants to replace a third of its jet fuel with biofuels by 2030.

"What we're trying to do is have everybody, from the producer all the way to the end user, sit down at the same table to talk about the best way to make this happen and to give assurances to each other that they're going to start making it happen," Jose says. "We want to show that it can work, then replicate it in the United States or anywhere in the world."

In 2007, Congress called for an annual increase in U.S. biofuels production from 4.7 billion gallons to 36 billion gallons by 2022. The Energy Independence and Security Act established a goal that 21 billion gallons of the 36 billion gallons must be advanced biofuels.

Jose is confident that enough biomass can be cultivated along the Mississippi River corridor, from Minnesota to Louisiana, to produce 30 percent, or 6.5 billion gallons, of the 2022 goal. He estimates that more than 110 million acres in the corridor are only "marginally productive" for traditional row crops, such as corn and soybeans, because of frequent flooding and soil erosion.

The land is, however, ideal for growing high-yield feedstocks that can be converted to advanced biofuels, including:

- perennial grasses, such as switchgrass and miscanthus;
- sweet sorghum, a warm-weather grass that tolerates drought;
- energy cane, a relative of sugarcane that's taller and higher in fiber;
- willow and cottonwood trees, fast-growing species that are native to the region.

Planting and harvesting just 1 million acres in the corridor could generate 1 billion gallons of advanced biofuels in the first five years after planting, Jose says. "If you look at the land base, it has the highest productivity of any region," he says, "so it has the best potential to produce biomass."

Jose says he plans to integrate MU Extension and educational activities into the consortium to

help train a workforce for a biofuels economy. An economist on the consortium's advisory board has estimated that growing, transporting, storing and processing biomass could create thousands of jobs and have an economic impact of \$3 billion to \$4 billion a year for the river corridor.

There are other benefits of cultivating biomass along the rivers. Most of the feedstock crops are perennials, which are healthier for the soil. Floodwaters would have little impact on the crops and might even help them thrive. Short-rotation crops, such as willow and cottonwood, and native grasses require little, if any, fertilizer or herbicide, so chemical runoff into the river is reduced. And once the crops are flourishing, Jose says, the land could serve as wildlife habitat.

"Conservationists have been trying to restore this river corridor by planting trees and perennial grasses, but this gives them a reason to approach landowners and say, 'Here is an economic opportunity,'" Jose says. "It's a market-based approach to conservation."

Roughly 600 farmers have already agreed to grow advanced biofuels feedstock, thanks to a U.S. Department of Agriculture program that pays landowners to establish sustainable energy crops. In May, the USDA chose Show-Me Energy Cooperative of Centerview, Mo., to launch the first Biomass Crop Assistance Program. Eventually, up to 50,000 acres in Missouri and Kansas, mostly unproductive cropland, are expected to be enrolled in the program to grow native grasses and herbaceous plants.

Landowners can receive payments for up to 75 percent of the cost of establishing a biofuel crop, in addition to five years of annual payments for grassy crops and 15 years of annual payments for woody biomass, such as willow and cottonwood.

Steve Flick, president of Show-Me Energy, says farmers bale and deliver the feedstock to the co-op for processing into biomass pellets. Show-Me Energy is producing about 100,000 tons of pellets per year, which are used to make a biofuel replacement for propane or blended with coal and burned to generate electricity.

"We've perfected the front-end processing of this facility, and we make a final product that gets used locally," Flick says. "That's good for economic development, as well as for understanding the mechanics of processing this material. If you don't have that down, I don't care what kind of technology you have, it ain't gonna fly."

Show-Me Energy is in the process of building a 10-megawatt power plant in Centerview, along with a facility that will produce 1 million to 2 million gallons of biobutanol, a liquid fuel that can replace gasoline without the need for engine alterations.

Facilities such as Show-Me Energy are at the heart of the consortium's biofuels commercialization strategy. Jose calls them Advanced Rural Bio Refineries, or ARBRs, and under his plan, 60 to 80 of them would be scattered throughout the Mississippi River corridor.

The idea is that farmers would bring their biomass to the nearest biorefinery for processing into pellets, which would be shipped to major commercial refineries in the Midwest. One such refinery in St. Joseph, Mo., is testing small-scale production of fuel made from cellulose

material such as switchgrass, sorghum and corn fiber.

“These major producers can collect pellets from a multitude of ARBRs,” Jose says. “That’s the concept: up to 10 major producers up and down the river corridor, each one supported by eight or 10 of these small rural processing facilities.”

When Jose talks about the consortium, he never fails to mention George Washington Carver, a scientist and inventor who founded a research laboratory to develop new applications for agricultural products. Like his contemporary Henry Ford, Carver believed farms were “God’s true storehouse,” able to “synthesize material for every human need.”

“That’s what we are trying to promote to help our nation meet its biofuels goal,” Jose says. “We aren’t there yet, but we have to start somewhere.”

**Share your comments with Mizzou magazine at [Mizzou@missouri.edu](mailto:Mizzou@missouri.edu).**

*Note: If published, feedback may be edited for length, style and clarity.*

---

 [Follow us on Twitter](#)  [Join us on Facebook](#)  [Subscribe to our feed](#)

---

Published by MIZZOU magazine, 109 Reynolds Alumni Center, Columbia, MO 65211 | Phone: 573-882-5916 |  
E-mail: [Mizzou@missouri.edu](mailto:Mizzou@missouri.edu)

Opinions expressed in this site do not necessarily reflect the official position of MU or the Mizzou Alumni Association.

Copyright © 2021 — Curators of the [University of Missouri](#). All rights reserved. [DMCA](#) and other [copyright information](#).

An [equal opportunity/affirmative action](#) institution.

**Last updated: Feb. 15, 2013**