FORUM

Farm-Based Energy and Sustainable Agriculture: Twin Missions for the 21st Century

America's farmers are critical to meeting the national goal of achieving greater levels of energy independence within the next two decades. They're also key to maintaining environmental health and sustained agricultural productivity.

Biobased fuels and products necessarily come from agricultural and forestry products—whether it's ethanol from corn or switchgrass, biodiesel from soybeans, or motor oil from *Cuphea,* to name a few. They are generally safer for the environment and for human health than products made from petroleum or chemicals such as the solvent acetone.

Last year, in support of the President's goal of replacing at least 25 percent of the nation's petroleum use by 2025, the U.S. Department of Agriculture (USDA) formed an Energy Council within the Office of the Secretary—the Department's first cabinet-level energy group. Its primary task is to establish USDA policies and priorities related to developing alternative energy sources, for both consumer and on-farm use. The council's secondary task, in part, is to promote development of more biobased products.

The Department has designated its first senior advisor on energy policy and will continue, through the council, to work with the U.S. Departments of Energy and Transportation and the Environmental Protection Agency. USDA expects to develop a complete national bioenergy plan by the end of 2006.

Within ARS, the National Program Staff has formed a Bioenergy Task Force to formulate ARS's role in USDA's bioenergy research plan. It has solicited ideas from agency scientists to assist in developing ARS's bioenergy research priorities. These priorities will form the basis of a bioenergy initiative in the agency's proposed FY 2008 budget.

The most recent Farm Bill—enacted in 2002 and the first to include funds for alternative energy development—reinvigorated ARS's longstanding energy research program. It's expected that USDA's Energy Council will give that effort an enormous boost, in turn affecting the 2007 Farm Bill.

As the article on page 4 shows, considerable progress has already been made in ARS's decades-long research on wind and solar energy production and on farm-based fuels. This includes work on new energy crops, such as *Cuphea,* which yields superior motor oil and may have potential as biodiesel fuel.

ARS is also pursuing innovative biobased products derived from agricultural wastes ranging from distillers grains to chicken feathers. And they're researching ways to reduce ethanol's processing cost by improving efficiency and commercializing secondary products from distillation byproducts. A new focus is on turning glycerol—a byproduct of biodiesel production—into commercial products.

USDA Rural Development (RD) will lead the Energy Council's commercialization plan, helping make available to consumers discoveries made by ARS and other USDA agencies. USDA-RD, under the leadership of Under Secretary Tom Dorr, will provide grants, guaranteed loans, and other market-based economic incentives to develop biobased industries in rural areas.

Soon, not only will U.S. farms be growing the raw materials for oil and ethanol production, they'll also be growing the industries that process them. In some areas, farmers have joined forces to cooperatively own these new energy industries—from ethanol processing plants to wind farms.

With formation of the USDA Energy Council and the ARS Bioenergy Task Force, we're in the best position ever to focus on and expand alternative energy research and transfer new technologies to the private sector.

This work is part of a broader picture in which farmers and ARS and other USDA agencies work together for changing agriculture in ways that sustain both the industry and the land, with benefits that extend beyond the farms—to urban and suburban environments. A major goal of ARS's sustainable agricultural systems program is to mitigate any harmful effects of agriculture on the environment and increase positive effects so that there is a net benefit to the environment.

Efforts include reducing air and water pollution from farms and ranches and managing them to enhance their traditional role of providing homes for wildlife. Using farm resources such as manure for fuels also fits well into our goal of finding profitable uses for resources that otherwise become pollutants.

Some biofuel crops, like switchgrass, are less erosive and require fewer chemicals than traditional ones. They can replace crops that require more fertilizer and water, giving farmers and rural communities added income and fuel savings as well.

Research on biofuel crops is just the latest addition to ARS's decades-long sustainable agricultural systems program, which balances farm and environmental needs. When economic and environmental interests come together like this, the entire society benefits. ARS scientists are proud to be a part of this effort.

Ghassem R. Asrar
ARS Deputy Administrator
Natural Resources and Sustainable Agricultural Systems
Beltsville, Maryland