

SCIENCE & EDUCATION Impact

Benefits from USDA/Land-Grant Partnership

No More Wasted Opportunities

Reducing, recycling and reusing waste and byproducts pay off.

Like other industries, agriculture has its share of waste products. Animal production, for example, can generate large amounts of manure that must be managed to protect water quality. Other practices, ranging from fertilization to proper disposal of pesticide containers and yard waste, also requires management. Land-Grant universities and the U. S. Department of Agriculture (USDA) are developing creative, cost-effective solutions to rural and urban waste management problems, often transforming waste problems into economic opportunities.

Payoff

- **Local leadership.** Decreasing landfill space in Pleasants County prompted **West Virginia** Extension to help develop a state-of-the-art recycling facility, retrofitting an old school next to a minimum security prison and training prisoners to work at the waste management facility. Cost effective and profitable, the facility now accepts recyclables from a multi-county region, saving valuable landfill space.
- **Wastewater winners.** In **Florida**, when the federal government ordered Orlando and Orange County to stop discharging 50 millions gallons of treated wastewater daily into a creek, local governments initiated a \$180 million Water Conserv II project to irrigate citrus, other crops and golf courses. **Florida** Extension signed up growers to use this water. University researchers now are measuring how wastewater nutrients help various crops. Everyone wins: urban areas get rid of treated wastewater, growers get an almost unlimited supply of free water and the environment is protected.
- **Manure matters.** Delaware's poultry industry, which accounts for more than two-thirds of the state's farm income, has grown steadily while land available for poultry waste application has declined. High phosphorus concentrations in the soil from poultry litter were troublesome until **Delaware** scientists worked with the industry to develop new feeding programs that allow chickens to digest phosphorus more efficiently. Phosphorus in poultry litter has been reduced by as much as 80 percent, helping protect water in poultry production areas nationwide. **Iowa State** researchers discovered a way to mix air-dried dairy manure with soybean-based

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adhesives and compress it into fiberboard. The new product, which smells nothing like its raw material, offers a substitute for conventional wood fiberboard. **Missouri** scientists developed new methods of capturing swine waste nutrients for crops, reducing fertilizer costs by \$1,700 to \$6,500 for each of the state's family-operated swine farms. **Oregon State** dairy experts constructed nine demonstration wetlands to improve manure handling and decrease runoff. They're also measuring how high-yielding forages use nitrogen from manure. As a result, Oregon dairy producers have been able to reduce manure management costs by a total of \$750,000 per year while also protecting water quality. **Tennessee** food safety experts developed new tools for detecting harmful bacteria in animal waste. Reducing potential food contamination at its source will help up to 30 million Americans avoid foodborne illness every year. **Connecticut** Extension is helping dairy farmers, horse owners and other livestock producers manage manure, comply with clean water legislation and maintain good relationships with neighbors in an increasingly urban state.

- **Whey wastewater.** When an Ohio food processor's 186,000-gallon daily discharge of whey wastewater exceeded EPA limits, **Ohio State** researchers developed a system to use the discharge and bring the facility into EPA compliance. Whey protein concentrates were captured by ultra filtration and used in new food products including chocolate milk, processed cheese and a fat replacement in low-fat foods. **Ohio** scientists also are working with a national restaurant chain to use whey protein concentrates in low-fat sausage.

- **Economical ethanol.** Biomass waste such as sugar-cane residues, rice hulls, forestry and wood wastes and other organic materials are a new source of ethanol fuel, thanks to a biotech "bug" developed by **Florida** researchers. Genetically engineered *E. coli* bacteria convert sugars in plant material, such as these wastes, into ethanol. Previously, the chemical makeup of these byproducts prevented them from being used to make ethanol economically. The technology is being used in a new \$90 million biomass-to-ethanol plant in Jennings, Louisiana, which is scheduled to open in mid-2000. The plant will produce 20 million gallons of ethanol annually. This technology will help reduce dependence on foreign oil.
- **Colorado compost.** No. 2 in the nation for fresh market potato production, Colorado growers are battling late blight, a devastating plant disease that destroys entire fields in a short time. To slow its spread, **Colorado State** Extension developed an educational program to provide growers with quick and accurate information, plus recommended control measures. They also found composting cull potatoes, when properly managed and monitored, destroys the late blight organism and creates a marketable product from agricultural waste. Proceeds from compost help offset the \$15 million growers spent each year to fight blight.



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