ENVIRONMENTAL STEWARDSHIP

Applying Innovation to a World of Waste

Wastes of all sorts—agricultural, processing and household—can create serious environmental problems and even health risks for people, animals and ecosystems. To protect the environment and promote sustainability, land-grant universities are identifying effective strategies for reducing waste, including new ways to treat and reuse solid waste and wastewater to conserve raw materials and freshwater, and educating citizens on reducing waste problems.

SUCCESSFUL EXAMPLES INCLUDE:

- Algae can be used as an alternative way to treat wastewater, avoiding traditional treatment methods that create unpleasant odors and produce toxic sludge. But it has been difficult for treatment plants to produce enough algae for effective treatment. Scientists in **Iowa** designed an innovative system that produces 10 times more algal biomass than a conventional system. After treating wastewater, algae can be harvested and sold as fertilizer—an economic opportunity for treatment plants that adopt the system. Chicago, the largest wastewater treatment system in the world, is piloting the algae system and has seen promising results.

- **Ohio** researchers are documenting the safety of using biosolids (organic matter recycled from sewage) as fertilizer in urban agriculture, green roofs and green spaces. It's important because some residues may include arsenic and lead. The research is providing a scientific foundation for state regulations for recycling of biosolids and wastewater.

- Thanks to **Kentucky** Cooperative Extension, 31% more residents participated in a household hazardous waste collection event in northern Kentucky. The event collected 16% more oil and hydraulic fluid and 300% more paint than the previous year, preventing environmental contamination, protecting water quality and reducing local landfill volume.

- Researchers in **Illinois** are evaluating the use of woodchips and fly ash pellets to treat wastewater contaminated with high concentrations of phosphorous.

- **Kentucky** Extension experts are educating people about the importance of waste reduction and management through a Master Recycler course. After training, Master Recyclers delivered over 50 hours of community outreach to over 2,000 residents at workplaces, community events and neighborhood association meetings, and on a Facebook page. They also helped residents install compost bins and piles.

- **Ohio** researchers discovered that adding phosphates can reduce the toxicity of soils contaminated with lead, an element that causes serious health problems among children. Cities could use phosphates to transform areas contaminated with lead into safe industrial sites, community gardens or green spaces.

ENVIRONMENTAL STEWARDSHIP

NEW WASTEWATER TREATMENT TECHNOLOGY FOR FOOD PROCESSING PLANTS

Food processing plants face unique challenges in treating their wastewater, which often contains a lot of fat and salt. Processors are required to use expensive pretreatment processes and then pay a surcharge to city facilities to help cover treatment costs.

Ohio researchers developed two onsite systems for treating these kinds of wastewater challenges. The first is a sand bioreactor that effectively processes high-salt, high-fat wastewater discharged from meat processing plants. This system costs $3.90 less per 1,000 gallons than traditional treatment. The second system uses hydroponic floating plant beds to lower wastewater ammonium, nitrate and phosphate levels. The floating plants can be harvested and used as forage or compost material, creating potential economic returns for processors. Both systems have great potential to protect local recreational waterways while also reducing costs for processing plants and wastewater treatment facilities.

PREVENTING ENVIRONMENTAL CONTAMINATION FROM OPIOIDS

The opioid drug crisis is a growing national addiction problem. Opioids also are an environmental hazard. Drugs that are thrown away or are part of sewage can find their way into water. Researchers have detected opioids in shellfish, and some are concerned that the drugs could work their way up the food chain and impair the health of species like salmon. To reduce the risk, **Alabama** Extension experts are helping residents dispose of pharmaceuticals and personal care products. In 2017, they conducted 10 take-back programs that diverted 4,255 pounds of opioids, other drugs and personal products from public landfills and water supplies.

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