

I M P A C T

CA&ES DEAN'S OFFICE • UNIVERSITY OF CALIFORNIA • ONE SHIELDS AVENUE • DAVIS • CA • 95616 • FAX (530) 752-9369

IMPACT is a series of publications highlighting how UC Davis' College of Agricultural and Environmental Sciences makes a difference in the lives of Californians. Through research, teaching and outreach programs, UC Davis research touches almost all aspects of Californian life. Today, millions of people eat safer foods, breathe cleaner air and drink healthier water with the help of our researchers. We're making discovery work -- for California and the world.

IS ANIMAL WASTE WASTEFUL?

THE ISSUE

Livestock is a major component of California's agricultural and rural economy. Dairy alone is California's leading agricultural product, valued at nearly \$4.6 billion. However, livestock waste is a contributor to the pollution of California's groundwater supply and air quality. The National Pollution Discharge Elimination System (NPDES) addresses the impact of wastewater, manure and other process waters on water quality at specific livestock facilities. These facilities, known as "confined animal feeding operations" (CAFOs), are subject to mandatory NPDES permits. As industry continues to improve and change, producers seek expertise in identifying ways to reduce water and air contamination.

WHAT WE'RE DOING

Scientists and Cooperative Extension specialists in the College of Agricultural and Environmental Sciences are collaborating with individuals in the state government, with producers, and with each other to work on alternatives to traditional methods of handling manure in order to reduce impact to the environment.

Educating producers. Launched through the California Dairy Quality Assurance (CDQA) Program and Cooperative Extension, and with the help of dairy advisors and CDQA partners, Livestock Waste Specialist Deanne Meyer organized an Environmental Stewardship short course to help producers under-



stand their legal obligations to meet federal, state, regional and local requirements for manure and water quality. Three two-hour classes cover regulations, risk assessments, manure management, emergency manure plans, storm water prevention plans and pond sizing -- and touch on manure nutrient value.

Diverting groundwater impact. Led by Associate Extension Specialist Thomas Harter, the UC Groundwater Extension Program is analyzing dairy waste management impact on groundwater in the Central Valley. Through collaboration with Extension Soils Specialist Roland Meyer, Harter's research reveals that improved manure management in crop fields has the most dramatic impact on decreasing negative groundwater quality impacts.

See additional **IMPACT** sheets on the web at <http://caes.ucdavis.edu/publications/impact/default.htm>

Extension Soils Specialist Stuart Pettygrove, along with Extension Agronomist Daniel Putnam and Deanne Meyer, conducted a three-year research project at 11 San Joaquin Valley dairies to demonstrate improved methods for managing manure water. The study shows that nutrients in manure water are potentially worth \$10,000-\$20,000 annually. Nine UC Extension farm advisors collaborated on this effort.

Converting manure into fuel. Bioenvironmental engineer Ruihong Zhang is working with anaerobic digestors-bioreactors that provide controlled conditions for bacteria to convert animal wastes into biogas, a fuel for electrical power generation. Zhang works in her laboratory with University of California-patented digestion technology. She hopes to further develop her pilot facility to process at least three tons of solid organic waste daily. According to the California Biomass Collaborative, California has a potential of producing 600 megawatts of electrical power through anaerobic digestion. Zhang believes that collecting biogas as a fuel will benefit the environment by reducing methane emissions into the atmosphere.

Mitigating air impact. Assistant Specialist in Extension Frank Mitloehner made an important discovery when he conducted an air quality study in four dairy cattle pens. "When the animals step on dry soil, they create a dust emission that deposits pollutants into the air," Mitloehner said. "By keeping the excrement moist, we reduce the amount of dust generated by the livestock." He suggests that an increased use of sprinklers in cattle pens can lower air pollution.

Mitloehner also is evaluating San Joaquin Valley livestock air quality emissions to determine if current estimates, based on a 1938 methane chamber study, are acceptable or need to be revised. His results will guide the Environmental Protection Agency (EPA), the California Air Resources Board and regional districts on whether cows and their waste indeed cause a significant proportion of annual ozone emissions, as current estimates suggest.

Guiding dairy producers. Meyer, Pettygrove, Harter, Mitloehner and other Cooperative Extension specialists are contributing their research and working with the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) to create the Comprehensive Nutrient Management Planning Technical Guidance. These guides help producers follow and manage manure nutrients appropriately for federal regulations, as well as for any state regulations that may follow. The NRCS will distribute the manual once it is complete -- especially through CDQA.

A SHARED VISION

Through the collaborative efforts of UC Davis CA&ES professors and UC Cooperative Extension program specialists, livestock producers are learning how to work with EPA's CAFO regulations. Research shows how to use waste material to benefit other components of California's economy, preserving our state's water and air quality.

That's impact -- science giving food producers the tools to protect their environment.

CONTACTS

Deanne Meyer, Livestock Waste Specialist
Department of Animal Science
(530) 752-9391
dmeyer@ucdavis.edu

College of Agricultural and Environmental Sciences

Neal Van Alfen, Dean
(530) 752-1605
nkvanalfen@ucdavis.edu

Rhoda McKnight, Director of Communications
(530) 752-9328
rjmcknight@ucdavis.edu

<http://caes.ucdavis.edu>

