Recycling Feedlot Runoff

Cattle, unlike humans, do not have the luxury of flushing their waste down the toilet into elaborate treatment systems. But livestock producers have various ways of protecting the environment from cattle waste, and one method is to collect all the runoff from feedlots in special temporary storage ponds.

These ponds do protect the environment, but they sometimes leak. Also, they smell bad and have to be emptied regularly. Agricultural engineers with the Agricultural Research Service have designed a system that solves these problems and comes with additional benefits.

At the Roman L. Hruska U.S. Meat Animal Research Center (MARC) in Clay Center, Nebraska, John A. Nienaber, Roger A. Eigenberg, and Bryan L. Woodbury have designed a system for beef cattle feedlot runoff control and treatment that, once built, requires little work from the farmer.

The feedlot at MARC is situated on top of a foothill. Rainfall runoff from a series of pens within this feedlot is directed to a shallow basin that runs the length of the pens. The runoff is collected and retained in the basin less than an hour, allowing the solid particles to settle. The runoff is then discharged to a hayfield, where the water and nutrients help the hay grow.

The retained solids have to be removed from the basin once a year. They are spread on cornfields as a soil fertility amendment.

"This system is a great way for small to medium-sized facilities to recycle nutrients from animal manure," says Woodbury.

Thousands of acres of corn and hay are planted each year for cattle to eat. Cattle are not able to use all the nutrients, such as nitrogen and phosphorus, contained in the feed. With this system, those nutrients are used to help grow the food cattle will eat, which saves money and prevents the nutrients from going into the environment. In the 3 years that the agricultural engineers have studied the system, there has been no runoff of nitrogen from the hayfields to the surrounding area.

Nienaber points out that the costs of designing, building, and maintaining this system are less than those for traditional ponds. It costs a lot of money and time to build the large ponds and to periodically pump the waste out of them.

Woodbury says the project will last another 5 years. During that time, the scientists will continue to evaluate the system's effectiveness.—By **David Elstein,** ARS.

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Cross-sectional Diagram of Feedlot Runoff Control System