Proper Manure Management

Four steps every cattle feeder should take to ensure environmental protection.

[PHOTO BY MICKY WILSON]

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Every year, cattle operations produce a lot of manure. That can be good, if it's properly managed and used as a nutrient-dense fertilizer. But if it's ignored and rain or snowmelt causes manure to run into nearby streams or waterways, it can be a costly headache and a regulatory nightmare for producers.

Regardless of the size of your cattle feeding operation, there are four key elements to proper management of manure and wastewater.

1. Storage

Whether you stockpile manure inside your pens or in other parts of your facility, all runoff from manure storage areas needs to be caught in an approved runoff storage structure, such as a lagoon, settling pond or concrete pit.

In fact, the regulations for concentrated animal feeding operations (CAFOs) require that all stormwater runoff is caught and stored if it comes in contact with manure and urine. That includes runoff from uncovered pens, alleys and loading areas. Even runoff from certain feed storage areas, like silage pits, needs to be captured in a lagoon.

"Take some time to look around your facility and think about which way the water runs when it rains," says Tom Brink of Brink Inc., an environmental consulting firm. "Does it all drain to the lagoons or somewhere else? If you answered somewhere else, you may need to install some drainage ditches or build diversion ditches to prevent runoff from running off-site."

It's also a good idea to catch solids through the use of a settling basin before they enter your lagoon system. A settling basin catches stormwater before it enters the lagoon and holds it long enough to let solids settle to the bottom. It helps prevent sludge buildup in the bottom of your lagoons so they don't need to be cleaned as often.

The use of solids separators can screen solid materials out of liquids by using gravity or mechanical means. Separator units can be stationary or portable, depending on the need. Once the solids are separated, they can be composted or transported to fields for land application.

Wastewater storage structures must be lined on the bottom and sides to meet state and federal requirements for seepage control. When it's time to clean the sludge out of them, be careful not to disturb the liner.

Federal law requires that CAFOs maintain enough storage in their structures to hold runoff generated by a 25-year, 24-hour storm. That amount will vary from region to region.

If solids are not removed before they enter the lagoon, additional lagoon capacity is needed to allow for sludge buildup, which slowly reduces a lagoon's storage space over time.

Lagoon storage systems must also hold a certain amount of process-generated wastewater, which is generated through processes like washing down chutes, trucks, processing areas or feedmills.

"The amount of lagoon storage for process-generated water varies from state to state, but it can be as much as the total amount generated in six months or more," Brink says. "Regulations also require CAFOs to keep the water level in lagoons a couple of feet below the top of the dam. This unused area is called 'freeboard,' and it serves as a safety cushion to prevent lagoon overflow during extremely rainy periods."

2. Recordkeeping

Good recordkeeping is your best protection against fines and penalties. And starting an effective recordkeeping program right now makes it easier to develop a comprehensive nutrient management plan for your operation.

"Many operators don't know really how much manure or wastewater is produced," says Tom Haren of AgPro LLC, a Colorado-based environmental consulting firm. "Where we find this most prevalent is in the use of water. Producers usually know every pound of beef to the penny but do not know how much manure or wastewater they produce. Best guesses can be off by thousands of tons or gallons. The better information we have to work with, the tighter we can design the system that best fits their needs."

It's also critical that you keep track of how much manure or lagoon water you put on your fields, as well as any commercial fertilizer. When you haul manure, you need to keep track of the amount you hauled, where it was taken, the date you hauled it and the driver's name."

If land application of manure is a problem for your operation — many states are now restricting direct manure application to soils — you may want to consider composting it. Composting reduces the volume and weight of manure, and converts it into an odorless, fine-textured product that makes an excellent fertilizer and soil enhancer.

Many producers across the country are also generating income by selling compost as lawn and garden fertilizers. This is especially beneficial for producers who operate in increasingly urbanized areas.

Finally, you'll also want to keep track of the water level in your lagoons. Producers should have in place a lagoon depth gauge that's marked at one-foot levels with marks that make them easy to read. "You should regularly record the depths of your lagoons, so you can manage their contents more effectively," Brink adds.

3. Nuisance and emergency management plans

Flies, odors and dust are all problems that cattle producers increasingly must manage, especially as they gain new neighbors who may complain to local authorities or regulators about these problems.

A nuisance management plan is a series of written strategies that you can use to minimize nuisance conditions. It should include categories for how you plan to manage odors, dust, insects, rodents and mortalities. It should also

contain information on how to reduce noise and traffic.

"For instance, your plan may include restricting pen-cleaning activities and manure application to morning hours only in order to take advantage of lighter winds and rising air," Brink says.

There are also sound economic advantages to managing nuisances, Brink adds.

For instance, excessive dust depresses feed intake and increases respiratory illness rates among both cattle and employees. Odor emissions also carry chemical compounds that can cause respiratory problems. Heavy fly infestations distract cattle from eating and carry disease as well.

Every CAFO operator should also have an emergency management plan that describes how you will manage environmental issues during a crisis.

The plan should include procedures for managing catastrophic events, including a lagoon dam breech, explosions and chemical or petroleum spills. It should outline the steps you will take when critical pumps and other equipment fail.

All the planning in the world isn't of any value unless the plan is followed," Brink says. "All employees should be familiar with the plan and be encouraged to ask questions and offer suggestions for improvement."

The document should be a "living" document, meaning that it should be updated to reflect new thinking and changing conditions.

4. More recordkeeping

For many producers, keeping good records is about as exciting as going to the dentist. But recordkeeping is critical to ensuring your operation remains in compliance with environmental regulations. It's also insurance when state or federal inspectors stop by your operation to inspect your environmental management.

A good recordkeeping system contains three basic elements.

First, it should have a complete, updated copy of your state's CAFO regulations, as well as a copy of your state or federal permit, if you have one. It should also include any engineering reports and drainage surveys of your operation.

Second, it should include a section that explains how you handle, store and apply manure and lagoon water, with maps that display the fields you are using for land application.

"You should always keep a tally of all manure that's removed, indicating whether it's being hauled to one of your fields or being removed by a third party," Brink says.

Third, you need to include records of lagoon-pumping activities and the amount you removed each time.

"It's easy to do this if you have a meter on your pump; if you don't, you can calculate the amount by multiplying the pump capacity by the amount of time you pumped," Brink says.

You should also include information on lab test results where you can insert results of soil, manure and lagoon water tests. These records should include information on how much nitrogen, phosphorous and other nutrients you have put on each field.

"You should document all lagoon-related activities, such as cleaning, liner repair and inspection, and record maintenance activities relating to equipment, including manure spreader repair and calibration, lagoon pumps, motors and pivot systems," Brink says.

All of these plans may seem like hard work, say professionals, but it's the best way to keep your operation in good standing with environmental regulators.

"In this day and age, you can certainly look at anything that you do that's good for the environment as something that can also be good for your business," John Etheredge, Hábil Engineering, says. "For instance, now there's a brewery in Fort Collins, Colo., that's advertising the fact that their beer is produced from wind power. It helps them to sell more product. There's no reason to believe that a feedlot being able to state that they are complying with seepage rate requirements from their waste lagoons can't do the same thing."