

INCREASING REGULATORY CONTROLS OVER ANIMAL FEEDING OPERATIONS TO ENHANCE ENVIRONMENTAL QUALITY

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Abstract. Economies of scale have led to the production of animals at large confined facilities concentrated in selected regions. Such production has been accompanied by environmental problems including the degradation of water quality. Both state and federal governments have enacted new legislation and regulatory provisions to respond to problems created by concentrated animal feeding operations. The emphasis of the adopted provisions has been on eliminating pollution and environmental degradation from animal wastes. A major consideration has been to reduce nutrient contamination of waters which occurs due to excessive applications of manure from large, concentrated operations.

Two possibilities can be examined to devise more successful mechanisms for controlling pollution from animals. First, more detailed regulations may better define which practices and operations need to be monitored as point sources of pollution. This might allow monitoring agencies to focus their efforts on smaller numbers of producers. Second, state governments may need new mechanisms for the more assertive enforcement of existing regulations.

INTRODUCTION

As animal feeding operations (AFOs) have expanded into larger concentrated animal feeding operations (CAFOs), animal production has come under increased scrutiny. CAFOs are AFOs that exceed a defined number of confined animals and meet other criteria delineated by federal or state law. During the past 40 years, our country has experienced a 92% decrease in the number of hog farms, a 93% reduction of farms with dairy cows, a 71% reduction in the number of poultry operations, and a 55% decrease in cattle operations (US Department of Agriculture, 1963; US Department of Agriculture, 1998). During this same period, cattle

numbers (excluding dairy) have increased by about 10% while hog numbers have decreased nearly 11%. With large numbers of animals at individual locations, excessive amounts of animal waste are impairing water supplies (Letson et al., 1998; Gollehon et al., 2001).

Two strategies may be offered to respond to the environmental conditions caused by CAFOs. First, governments may adopt regulations that more definitively regulate polluters, including risks of pollution. Second, regulators might engage in greater enforcement efforts with respect to existing regulations. The adoption of either of these strategies may obviate the need to regulate more AFOs using National Pollution Discharge Elimination System (NPDES) permits.

MORE DEFINITIVE PROVISIONS

In the main, regulations addressing alleged contamination from AFOs have been directed to regulating facilities over a certain size rather than actual pollution. This occurs because the governmental provisions employ animal numbers rather than the potential for a discharge of pollutants to establish regulatory thresholds for permits (Environmental Protection Agency, 2003).

Several ideas exist that may facilitate reductions in pollution without the adoption of new permit provisions covering more CAFOs. Regulations can differentiate between covered and noncovered production areas, establish management practices that exempt selected AFOs from CAFO regulations, direct safer construction of lagoons and manure-storage structures, and provide distinctions based on watersheds. These ideas serve as foundations for further efforts by scientists, regulators, and citizens to formulate practices and regulatory requirements that would reduce environmental problems from AFOs.

Covered Versus Noncovered Production Areas

The first idea involves regulatory controls that distinguish between covered and noncovered production areas. In areas where rainfall exacerbates the possibilities of contamination of water resources, more stringent regulations may be appropriate for AFOs that have uncovered confined production areas. Facilities that house animals in covered structures and have covered manure storage structures may not need to be subjected to the same requirements as facilities that allow rainwater to mix with urine and feces in enclosed production areas. Through the further differentiation of agronomic practices that are more likely to be accompanied by environmental problems, we might be able to regulate fewer producers while attaining improved environmental quality.

Directives on Manure Management

While governments and producers have both employed manure management programs as a means to reduce pollution, further consideration of an opt-out provision may enable qualifying AFOs to avoid all of the regulations applicable to CAFOs. Manure management is indispensable to the oversight of surplus nutrients from animal waste. State legislatures have adopted provisions requiring training for persons in charge of disposing of manure and management system operators (*Iowa Administrative Code*, 1999; *North Carolina General Statutes*, 2000), mandating persons who apply nutrients to land to complete an educational program (*Maryland Agriculture Code Annotated*, 2001), and enumerating topics that should be taught to operators of CAFOs (*Georgia Compiled Rules and Regulations*, 2001). Some of these state regulations are distinct from the NPDES permit requirements.

Some state nutrient and manure management provisions delineate practices that foster the use of nutrients for crop production. Minnesota enunciates a general prohibition against application of manure that would cause contaminated runoff (*Minnesota Rules*, 2000). On lands prone to flooding, manure application through injection or incorporation into the soil may be required (*Iowa Administrative Code*, 1999). Similar provisions may apply to steeply sloping cropland (*Iowa Administrative Code*, 1999). To minimize runoff of manure, northern states limit the application of manure on snow-covered ground (*Illinois Compiled Statutes Annotated*, 2001). Another provision may prohibit manure application in road ditches (*Minnesota Rules*, 2000).

While these provisions serve as appropriate practices to reduce pollution, they also might be incorporated into eligibility criteria that would allow qualifying producers to be exempted from NPDES permits. Through the delineation of prerequisites, producers might be encouraged to implement practices to reduce potential pollution so they would not need to secure a governmental permit.

Lagoons and Storage Structures

While animal waste lagoons and storage structures are not new, contamination of waters by lagoon collapses has spurred greater regulations (Schmidt, 2000). Particularly important are the design provisions being added by many states through legislation and agency regulations. Advances in science have meant that the design and scale of lagoons have changed considerably. Lagoons have gotten larger, corresponding to larger animal production operations, and have incorporated new design specifications that make them less likely to fail. They also may be precluded from environmentally sensitive locations, such as a 100-year flood plain (*Georgia Compiled Rules and Regulations*, 2001).

The most common safeguards embody professional requirements for persons involved in designing manure storage structures and lagoons. Generally, the regulatory provisions establish a requirement of design preparation by a professional engineer (*Minnesota Rules*, 2000). Common design specification concerns lagoon liners, lagoon capacity, and installation of groundwater monitoring wells. Due to the release of ammonia and odors from animal waste lagoons, some states are moving to prohibitions. North Carolina plans to eliminate the use of open-air lagoons entirely. A second idea, incorporated in a Georgia rule for swine operations with more than 3,000 animal units, is to prohibit new swine CAFOs from having an uncovered lagoon (*Georgia Compiled Rules and Regulations*, 2001). Other provisions require security that could be used to respond to problems when the storage facility is closed (Centner, 2002).

The adoption of appropriate manure storage provisions, along with appropriate inspection and enforcement actions, may eliminate some pollution problems.

Watersheds

Water pollution from nitrogen and phosphorus is not necessarily connected to the size of an individual CAFO. Rather, the problem involves the location of excess nutrients and the impairment of water resources. While

authority exists for governments to take action and prevent future problems, it can be argued that more exacting regulations are needed only in areas where there are problems.

Thus, concern about nitrogen and phosphorus pollution from CAFOs suggests a response that would match impaired waters (and watersheds) with CAFO proscriptions. Drawing upon the European Union's nitrate directive (Council of the European Communities, 1991), the United States might format more stringent regulations for areas where animal production is a contamination problem. Rather than regulating more CAFOs under NPDES permits, regulators might employ an abbreviated registry system drawing upon precision farming technology and geographical information systems to pinpoint actual contamination problems. Regulations containing individualized responses for eliminating contaminants could be applicable only in regions or watersheds with nutrient problems.

ENFORCING EXISTING REGULATIONS

Governments and agencies enact regulations in response to society's desire to control activities and conduct. But the enactment of a regulation without more enforcement cannot be expected to achieve its objectives. Suitable provisions for deterrence must be incorporated into the regulations and adequate enforcement mechanisms must be implemented. Enforcement must consist of detecting violations, prosecuting, and punishing violators. Potential offenders must rationalize that the likelihood of being caught and punished for violating a regulation is more reprehensible than the benefits that accrue from violating the regulation.

Existing legal provisions governing AFOs enumerate two categories of potential violations. Any unpermitted discharge of pollutants from a point source into the waters of the United States constitutes a violation. This could involve a lagoon rupture. The failure to secure a required NPDES permit or a breach of the conditions set forth in a permit also constitute offenses.

Under the cooperative federalism incorporated in the Clean Water Act, the Environmental Protection Agency commissions states to administer and enforce federal laws. State agencies are authorized through an annual agreement known as a Memorandum of Agreement or a Memorandum of Understanding (Riesel, 1996). State administrative agencies monitor firms for compliance and can issue citations and reach agreement with violators for

voluntary payments of fines and other appropriate procedures.

However, the enforcement of violations is not handled by the state monitoring agency. Rather, alleged violations must be referred to the state attorney general or other enforcement agency. The enforcing agency determines which violations shall be prosecuted. The prosecuting agency must prove that a regulation was violated, and, upon proof of a violation, the judicial tribunal must impose a penalty. These multiple actors mean that augmenting environmental quality may involve more than simply enlarging the class of regulated firms. Changes affecting monitoring, the ability to detect violations, and the willingness to prosecute all impact regulatory compliance.

Data from the Environmental Protection Agency suggest that nearly 80% of CAFOs have failed to timely secure required permits (Environmental Protection Agency, 2001a, p. 3080). Moreover, informal communications by states note that they lack the personnel and financial resources to monitor and prosecute violations of CAFO regulations (Environmental Protection Agency, 2001b). Under the data employed by the Environmental Protection Agency in 2001 to propose new regulations for CAFOs, operators would incur between \$226-298 million in pre-tax compliance costs (Environmental Protection Agency, 2001a, p. 3124). Since the Environmental Protection Agency's proposal suggested regulating 12,880 to 26,660 additional CAFOs, an average operator might be expected to incur between \$11,177 and \$17,546 to comply. Given the size of these expected costs, the benefits accruing to CAFOs foregoing compliance are considerable.

Given current enforcement conditions and calculated compliance costs, it may be concluded that existing regulations as well as proposals to increase the number of regulated CAFOs may not constitute an optimal response to the environmental problem of pollution by AFOs. The expansion of the number of regulated firms under broad regulations characterized by low compliance may cause environmental quality to decline (Mullen and Centner, 2003). This may occur if firms decide not to comply with the regulatory commands. Rather than expanding the number of operations regulated as CAFOs, governments might consider augmenting their enforcement efforts. Modest increases in funds available for monitoring CAFOs and more assertive enforcement may be more beneficial to improving our water quality than reforms that seek to expand the numbers of permittees.

CONCLUSION

Additional research and careful drafting may allow regulators to devise regulations that are more effective at curtailing pollutants from entering waterbodies while regulating fewer firms. Through more definitive provisions, and greater enforcement, we might direct regulations at existing discharges and actual pollutants so that fewer firms would need to be subjected to costly permitting regulations.

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