

ADDRESSING POLLUTION FROM ANIMAL FEEDING OPERATIONS

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Abstract. Agriculture has been identified as a major polluter of waters in the United States. With the marked expansion of animal feeding operations (AFOs), the public has become more aware of the pollution problems posed by animals. In this paper, federal and state governments are projected to respond to inadequacies of current regulations controlling animal waste. The paper concludes that governmental regulations may incorporate additional scientific information and management strategies to reduce unnecessary costs. Until governmental AFO regulations embrace sustainability concepts, adopt market incentives, and regulate actual rather than potential pollution, society will be wasting resources and incurring unnecessary expenses in the production of animal products.

INTRODUCTION

Most Americans are endorsing efforts to achieve a cleaner environment. Although support for individual legislation dealing with environmental issues varies, the regulatory landscape has markedly changed. Wastewater treatment plants and point-source pollution regulations have conspicuously removed tons of pollutants from our waterways. Policy makers are now directing their attention to nonpoint-source pollution, and are attempting to evaluate the costs and benefits of new regulations. Despite technological advancements, considerable knowledge is missing concerning how to manage our environment. Policy makers cannot forecast correctly how individuals or an industry will respond to a particular regulation. This means that policy makers design choices based on incomplete information. When policy makers fail to consider all of the benefits and

costs, thereby setting environmental standards too low, damages are thrust upon neighbors or future generations.

In looking at what is happening in animal production, several important transformations help forecast projected changes. The world will experience continued specialization due to technological and biological inventions. In the United States, this means greater concentrations of animals. Given societal expectations, more emphasis is expected to be placed on environmental quality. Stringent environmental regulations will undoubtedly be enacted to limit the problems caused by the concentrations of animals (Metcalf, 2000).

Our country can improve the environment while permitting the continued production of animal products. For policy makers, including those in Georgia, the greatest challenge will be selecting the options available for managing agricultural pollution. Multiple governmental institutions exist for responding to environmental problems generated by AFOs. While command and control regulations are the most obvious, they often are not an optimal institution for controlling deplorable nonpoint-source pollution due to excessive costs (Sohngen, 1998). Rather, more flexible options may be considered (Frisvold, 2000). The incorporation of agronomic and scientific information into regulations can facilitate a more economical reduction of pollution.

SPECIALIZATION

Advances in science, geographical information systems, technology, and the ability to employ computers to project consequences have led to an astounding amount of information to be employed in the specialized production of animals. The real driving force of

specialization is economics. In a capitalistic system, production inputs need to be employed to their fullest. Economies of scale favor specialized production facilities. Farmers and ranchers have aggregated farm animals into large AFOs to eliminate multiple sets of equipment, facilities, operators, and expertise.

A downside associated with the concentration of animals is the large quantity of manure and nutrients generated at a single location. Due to excessive amounts of nutrients and odors, concentrations of large numbers of animals create environmental problems. Both real and perceived problems are driving governments to enact more stringent environmental regulations. Under these regulations, farmers will need to adopt new technologies and practices. These will cost money. Thus, the costs of environmental compliance reduce profits. This may encourage even greater concentration.

The emergence of two types of technology will affect specialization and allow regulators to assign pollutants to individual farms. Precision farming technology involving remote sensing, yield monitoring, variable rate technology, and positioning satellite imagery is allowing farmers to map field conditions (Frisvold, 2000). The mapping is detailed enough so that farmers can relate data to make production decisions on the use of inputs. Precision farming technology allows information to substitute for more traditional agronomic inputs. Farmers can limit amounts of fertilizer, pesticides, and water to those needed for optimal production.

The second technology is known as geographical information systems. Again, computers are used to map an area. Mapped areas are correlated to other databases to provide descriptive statistics that can be used for production and environmental decisions. Descriptive geographical information system applications draw upon location information of farmers and practices to show environmental impacts. Information from other databases may be used to show the efficacy of pollution control programs and costs of environmental requirements.

Specialization encourages discoveries and the use of new technology to improve economic performance. While specialization has led to large AFOs and concentrations of nutrients that can cause environmental

problems, technology and nutrient models allow AFOs to respond to environmental problems without the adoption of further restrictions or prohibitions. Additional research addressing nutrient management issues may provide new solutions for alleviating contamination problems. The question is whether farmers will eliminate sufficient pollution before the public pushes regulators into prescribing more onerous environmental controls.

GREATER ACCOUNTABILITY AND MORE EXPENSIVE PRODUCTION

Given our country's wealth and standard of living, the public is demanding that agriculture be accountable for its pollution. Agriculture is too small a segment of our economy to withstand public pressures for improving environmental quality. Farmers need to work with the regulators in devising reasonable environmental controls. While the individuality of nonpoint-source pollution make it more difficult to regulate, and the nature of agriculture may require special consideration, this category of pollution will not escape environmental oversight. Agriculture should expect additional regulations holding farmers more accountable for contamination and polluting activities.

Technological advances are helping drive this environmental control mentality. Through the application of precision farming technology and geographical information system applications, it is becoming technologically feasible to treat farms as point sources of pollutants (Frisvold, 2000). This is especially true for facilities where we can count the number of animal units. Technology will encourage adjustments in inputs and methods of operation to eliminate environmental problems.

Detailed data examining agro-environmental relationships can be used for policy analyses and the formulation of more exacting policy instruments. The same data employed for producing crops more efficiently can serve as the basis for more detailed accountings of pollutants (Frisvold, 2000). This technology will promote better regulations that can incorporate flexible controls more attuned to actual pollution problems.

With diminished numbers of family farms, legislation exempting all of agriculture from environmental controls

or other burdensome regulatory controls will be revised. More agricultural practices will come under governmental regulations. While many options exist, agricultural interest groups can advance two regulatory approaches to lessen the financial hardships that new rules will pose on farmers. First, farmers can support governmental programs that provide funds to address environmental problems. A second approach is to favor legislation that targets specific practices or offensive operations rather than mandating requirements for an entire segment of an industry. For example, by employing appropriate scientific information and data, regulations on animal wastes could be limited to those production operations that impair waters below established legal thresholds. Current regulations that regulate all farmers impairing water quality can be revoked in favor of regulations that only apply to situations where the pollution is foreboding.

Despite the costs of technological innovations and environmental controls, the major benefit of current efforts is the opportunity to tie environmental costs to individual situations. As new technology allows information to substitute for material inputs (water, pesticides, and fertilizers), it provides a better procedure for identifying sources of pollution. Thus, technology will provide a means to adopt specific practices and regulations that narrowly address problems rather than providing controls on an entire industry. This will allow product prices to more accurately reflect associated environmental costs. In the long run, technology and environmental controls can reduce pollutants so that our country achieves productivity gains.

NEW REGULATORY INSTITUTIONS TO PROVIDE FOR ENVIRONMENTAL QUALITY

One of the challenges for policy makers is to develop new institutions to assist farmers in meeting environmental expectations. The command and control strategies so often used for point-source pollution are not appropriate for most nonpoint-source pollution problems. Under a command and control regulation, a government sets forth a requirement, and farmers are obligated to meet the criterion. Failure to comply entails a violation that may result in a sanction. While

command and control standards are the most obvious approach for reducing pollution, they unnecessarily burden operators without a pollution problem. Therefore, other options should be considered.

The most likely responses will involve incentive-based systems with flexibility in responding to specific pollution problems (Frisvold, 2000). While various options show that costs associated with environmental quality can be borne by the polluters, third parties, or the government, technology may alter the responses deployed in new regulatory institutions. The conservation programs of yesteryear, with their twin goals of income support and environmental benefits, may give way to more definitive environmental goals (Frisvold, 2000). Individual pollution problems and specific nutrients may be targeted with regulations anticipated to resolve public concerns (Centner, 2000).

Performance standards have been identified as one possibility for agricultural pollution from AFOs (Sohngen, 1998). Such standards could dictate the level of pollution abatement required while recognizing that farmers are in a better position to understand the effectiveness of various practices available for minimizing environmental degradation than regulators. Performance standards mandating pollution reductions could be tied to cost-share programs (Sohngen, 1998). Individual farmers could decide what practices or technology to use to meet the prescribed reductions of pollution.

Along with questions of options, choices in level of governmental regulation are important. Under cooperative federalism, states are the level of government where most additional regulations will be adopted. However, for environmental issues of local concern, cities, towns, townships, and counties can become more involved in responding to the public's demand for improvements in environmental quality. Many local governments will be forced to evaluate the tradeoffs between economic growth and environmental quality and make their own decisions as to the controls they desire to secure environmental attributes. Governments may also be expected to strive to maintain an equitable balance between private property rights and the protection of the rights of others, including neighbors and future generations.

SIGNIFICANCE FOR AFOS

What should AFOs expect in terms of society's concern about agricultural waste products? While recent legislative responses disclose a trend for governments to become more proactive in adopting regulations to help prevent nonpoint-source pollution, other measures may be more important. Given the costs and problems of enforcing regulations governing nonpoint-source pollution, alternative methods can be adopted to achieve reductions of pollution by AFOs. Planning exercises, educational programs, technical assistance, cost-share mechanisms, and financial grant programs offer methods to address pollution activities.

Production agriculture will continue to change. Not only will this mean the demise of some agricultural operations, but also the necessity of adopting practices to meet the dictates of increased environmental regulations (Schoenbaum, 1993). A desire to achieve sustainable production, or to diminish the denigration of ecological resources, can lead to new regulations on production practices. The public interest in a cleaner environment can express itself in requirements that force AFOs to reduce pollutants contributing to the impairment of water quality. Society and local governments can ask whether optimal livestock production involving potential nutrient pollution is consistent with a region's long-term objectives. A community, county, or state can conclude that safeguarding ecological and natural resources is more important than allowing AFOs to engage in practices that increase phosphorus and nitrogen loadings in soils and waters. Regulatory action may restrict the activities of AFOs and increase the costs of disposing of manure.

Agriculture has responsibilities beyond the production of food and fiber. One of these responsibilities is to refrain from unacceptable denigration of common air and water resources. Another responsibility is to preserve our land and water resources for future generations. The public may be expected to demand greater efforts to reduce water contamination by nutrients, and that such efforts will make agricultural production more expensive. The question is at what level the regulations will be enacted. While uniform federal regulations exist, states and local governing bodies can choose to enact additional requirements. To

fully incorporate technology and science into detailed regulations that address the particular environmental problem, states rather than the federal government are expected to enact the major regulations responding to AFO problems. This will be expected to result in some companies moving to new locations to minimize costs. AFOs may gradually shift to regions and states with more lax regulations due to the added expenses associated with environmental regulations.

Local governments can also elect to pass regulations that affect animal operations. Under their authority to safeguard public health and well-being, local governments may enact permitting requirements for new operations with more than a defined number of animals. Another local requirement could involve buffer zones to safeguard existing residences and other land uses from objectionable odors associated with large animal operations. As these two possibilities reveal, local regulations have the potential of discouraging the development of animal operations in an area or a county.

LITERATURE CITED

- Centner, T.J., 2000. Animal feeding operations: encouraging sustainable nutrient usage rather than restraining and proscribing activities. *Land Use Policy* 17:233-244.
- Frisvold, G.B., 2000. Data, information, and rural environmental policy: What will the next ten years bring? *Review of Agricultural Economics* 22:237-244.
- Metcalfe, M., 2000. State legislation regulating animal manure management. *Review of Agricultural Economics* 22:519-532.
- Schoenbaum, T.J., 1993. Trade and environment: Free international trade and protection of the environment: Irreconcilable conflict? *American Journal of International Law*. 86:700-726.
- Sohngen, B., 1998. Incentive based conservation policy and the changing role of government. American Farmland Trust, Center for Agriculture and the Environment, WP98-6.