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SETTING THE ANIMAL WASTE MANAGEMENT POLICY CONTEXT

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The animal waste management policy issue is complex. In this paper, we propose that the animal waste management policy debate is complicated by a number of factors that arise from changes taking place in the animal industry, and within the rural population. The debate is also complicated by the number of different policy issues that are nested within the general issue of animal waste management, including environmental concerns, economic concerns, and quality of life concerns. These changes are driving an increased demand for policy responses to animal agriculture, in general, and to animal waste management, in particular. Policy responses are occurring at the federal, state and local levels, as each level of government attempts to respond to the broad array of public concerns. The extent to which different levels of government are responding with different types of policies further complicates the debate about where and how animal waste management policy is developed.

Changes in Animal Agriculture

Changes in the animal agriculture industry are characterized by changes in the *size of operations*, changes in the *form of vertical coordination*, and shifts in the *location and siting of animal agriculture*. At this outlook conference in 1998, Laura Martin Cheney described these changes in the context of whether they are causing or being caused by environmental policy changes (Martin and Norris). Evidence is mixed about the direction of causality, but it is clear that changes in the industry are fueling a public demand for policy response. A quick review of these changes will be useful.

Size of operations refers to the physical size of the operation defined by the number of head or acres of land, rather than defined by gross revenues or farm income. Defining size this way is appropriate in this context because the social and environmental issues associated with animal agriculture appear to be correlated with the number of animals coupled with the associated land base, rather than the dollar value attached to any farm operation. Obviously, if acreage per head can be increased or if environmental management is improved, this correlation weakens. Nonetheless, size appears to be a good proxy for many concerns.

The greatest factor driving the movement toward larger farm size has been the introduction and adoption of new technologies that, for the most part, have not been scale neutral. Improved disease control and feed programs, coupled with the movement toward confined production operations and

greater fixed investments, plus the desire of processors to deal with fewer but larger supplies, have led producers to increase output, lower per unit costs of production, and adjust to new sources of production and marketing risk.

In the case of animal agriculture, issues associated with the size of the operation are closely linked to the issue of *animal density*, here defined as the number of animals per unit of land. To a large degree, the increase in animal density has been the result of increased specialization and changes in the type of vertical coordination which characterize the pork and poultry subsectors.

Changes in the *form of vertical coordination* describe changes in the type of coordinating mechanisms used by input suppliers, farmers and packer/processors. Characterizing vertical coordination as a spectrum, with cash or spot markets on one end and complete ownership integration on the other end, changes in the way that farmers and farms operate can be observed moving toward the integration end. A growing body of literature exists, both empirical and theoretical, as to why certain forms of vertical coordination occur. Within this literature, there is a general consensus that several key factors are involved in the movement from spot markets to contracting or ownership integration. These factors include reduced transaction costs, increased responsiveness to consumer demand, improved quality control (e.g., food safety, consistency, and uniformity), risk shifting and risk reduction, and production efficiencies from specialization. In addition, for many young farmers, production contracts have been viewed as a means to get started in farming and obtain easier access to capital (Rhodes and Grimes).

Locational changes in animal agriculture are characterized by two different types of adjustments: a) shifts of animal production between regions and b) clustering of production within a region. The movement of pork production out of midwestern states and into the southeast is an example of a recent regional shift.

Clustering in animal agriculture arises from production facilities locating in close proximity to one another within a given region (Pagano and Abdalla). Clustering is a cumulative phenomenon. The establishment of a processing facility, for example, draws increasing numbers of producers. Once sited, producers tend to adopt production and manure management technologies to achieve improvements in economies of size, adding animals to generate revenue to pay for such technological improvements.

Demographic Changes

As the animal agriculture industry changes, other changes are also occurring. A continual increase in the affluence of the American population has changed expectations of the public with respect to environmental quality. A wealthier, more educated population is focusing more and more attention on how their quality of life is affected by their physical environment. As a result, reductions in environmental quality that might once have been acceptable or overlooked are now subject to much greater scrutiny.

When this attention to environmental quality is combined with shifts in where people are living, the implications for agriculture are particularly evident. The population is continuing a shift that began with the 1960s' movement into suburbia and is now characterized by further movements from urban and

suburban areas into traditionally rural landscapes. Rural populations are now composed of significant numbers of residents who have no links to, and little knowledge of, agriculture.

Changes in Property Rights

These changing demographics are linked to a shift in property rights related to environmental quality. Bromley has noted that agricultural landowners have enjoyed a wide range of actual and presumptive rights that have been reflected in both agricultural and environmental policies (Bromley, 1990). With more and more rural landowners who aren't involved in agriculture, the presumed rights of agricultural producers to create externalities (i.e., to pollute) are being called into question. The movement of a more affluent population into rural areas means that these residents bring with them certain assumed rights to environmental quality. Many of these new residents bring with them a political savvy and a willingness to become involved in local policy that has not characterized the rural, agricultural population. Clearly, then, both rights and responsibilities related to environmental quality in agricultural areas are being redefined. With this redefinition comes the demand for a policy response to enforce those rights and responsibilities.

A Complex Policy Issue

The animal waste management policy debate is complicated because it encompasses such a broad array of issues. With a history of environmental policies targeting protection of specific media or discharges from particular sources, U.S. policymakers have little experience with a policy debate that is so broad. There is no single policy issue around which the public has formulated their demands for regulatory attention to animal agriculture and waste management. Rather, there is nesting of issues that create demand for policy response, and this nesting complicates policy design and implementation.

Several particular issues that have received considerable attention by the media and by critics of animal agriculture include:

1. Objections to structural change: Opponents of the size and structural changes in animal agriculture express concerns about the loss of a traditional farming structure with many small farm operations dotting the landscape. Existing traditional farm operations object to the size and structural changes because they are concerned about competition for resources, such as land and water, as well as competition for markets. These concerns will not be allayed by improvements in environmental quality.
2. Objections related to size and locational changes:

Water quality concerns – Rural residents express concerns about water quality degradation arising from the concentration of large numbers of animals in individual production facilities. Over the course of a year, the quantity of nitrogen in manure generated from a 200-cow dairy is the same as sewage from a community of 5,000 to 10,000 people; the phosphorus from a 22,000-bird broiler house matches the quantity produced in sewage from a town of 6,000 people (Moffitt). Production units larger than 200 cows or 22,000 broilers are common to industrialized clusters. It is not uncommon to hear the public express concerns that there are no waste treatment requirements in animal agriculture, while human wastes are treated before being released back into the environment.

Land application of animal manures is an accepted and beneficial method of disposing of those manures that also capitalizes on the manure's resource value as a soil amendment. However, as animal facilities get larger and become more specialized, it is harder and harder for an individual operation, in some locations, to obtain access to sufficient cropland or pasture land acreage to apply manures at a rate that does not threaten water quality.

Odor and related nuisances – Nuisance damages associated with odor and flies are less well understood, more location specific, and more difficult to measure and monitor. Yet nuisance complaints figure prominently in localized conflicts surrounding the siting and on-going coexistence of livestock production facilities and their neighbors. Both size of production facilities and proximity of the facilities to other residents contribute to increased concern about odor and other related nuisances. A recent decision by the Iowa Supreme Court focused new attention on the extent to which agricultural operations, as nuisances, can be afforded protection by state-level right to farm laws.

Public health concerns – Both water contamination and odor are raised as potential threats to public health in areas surrounding large, intensive animal operations. Outbreaks of *Phyteria* on the east coast have been linked tentatively to nutrient enrichment of coastal waters, with animal agriculture indicted as the most likely source (Mallin). The *Phyteria* bacteria has not only caused fish kills; it has caused neurological damage in humans, including short term memory loss (Grattan). Research in North Carolina, and other locations, has indicated that exposure to strong odors can cause respiratory, digestive and gastro-intestinal, as well as psychological disorders (Schiffman; Thu).

Property value impacts – Concerns about declining property values in areas near animal facilities are also being expressed. Research results are mixed. However, localities in Illinois, Iowa, Minnesota, Michigan and North Carolina have adjusted real property taxes to reflect perceived reductions in property values associated with water quality, nuisance and public health concerns.

The primary reason that this nesting of issues complicates policy design is that finding an effective solution to one particular issue will not result in satisfaction of the public demand for response. This is particularly true if the issue that is resolved is not the one creating the majority of public concerns. For example, fly problems around egg laying houses in southeast and central Pennsylvania caused considerable conflict between the agricultural operations and their neighbors. However, as efforts to control flies were combined with community outreach and collaborative problem solving programs, it became evident that, even with the fly problem solved, people would still vigorously object to the animal operations (Abdalla and Kelsey).

Similarly, that many complaints focus on water quality risks doesn't necessarily imply that water quality is the primary concern. Rather, under current federal law (and most state laws), water quality is the only issue which offers a legal hammer. It is not surprising, then, that opponents of operations seek to wield it. When conflicts between neighbors lead to court cases, plaintiffs face a legal dilemma: the only policy instruments that give them legal standing are the federal NPDES permit requirement (written to assure surface water quality) or state regulations on nutrient management (designed to prevent water pollution). The lawsuit is about the adequacy of the animal waste management for averting water pollution, even if the actual problem is odor, flies, or more abstractly, the disruption of a way of life (Norris and Thurow). A New York case is illustrative. Local environmental organizations and

neighbors of Southview Farms, a 2,200 cow dairy farm, sued the owner/manager on the grounds that he was guilty of noncompliance with his NPDES permit. Allegations included ground water contamination affecting drinking water and surface water contamination from dairy effluent. According to the New York Commissioner of Agriculture and Markets, however, “this case was really about odor” (Merrill). The problem for animal production operations, and for the design of animal waste management policy, is that such legal arguments do not send signals that motivate change in behavior or technology to address the root problems causing resistance to large-scale agriculture.

Within the context of nested issues, policy design is further complicated by the diversity of preferences about the relative value of agriculture and environmental quality. These preferences vary significantly by state and within states. A federal policy that is responsive to this diversity of preferences is much more difficult to design and implement than is one that treats all areas essentially the same. A similar diversity exists with respect to public responses to things like differences in animal species. In some locations, for example, poultry or beef production are known entities while pork production is a new, unwelcome addition to local agriculture. As a result, expectations about and acceptability of regulation of pork operations, compared to other species, may differ. State laws in Kentucky, Colorado and Oklahoma specifically address pork production to the exclusion of other species.

Public and industry expectations about how animal waste management policy addresses the size issue also introduce complications. One overriding question is whether smaller operations should be subject to the same regulatory requirements as larger operations. Critics of current policies raise questions about whether a 999 animal unit operation poses less risk to water quality than a 1000 animal unit operation. (Clean Water Act NPDES permitting requirements automatically apply to operations with 1000 animal units or above.) Industry views are mixed. Economies of size, combined with more modern technologies and potentially higher management skills associated with the newer large-scale operations, suggest that such operations are better equipped to adopt manure management technologies. However, industry representatives also question the fairness of limiting financial assistance for compliance to small facilities (as does the federal Environmental Quality Incentives Program). North Carolina provides an interesting laboratory in which this dilemma is playing out. A survey of waste management facilities in that state showed that smaller, older hog operations were more likely to be chronic sources of waste discharges (Zering). However, the 1995 rupture of a hog waste lagoon and the release of some 25 million gallons of waste material into the New River focused concerns on the acute risks associated with spills from larger operations.

With rare exception, federal and state regulations focus exclusively on water quality protection. However, as more and more local objections to large animal operations arise because of odor concerns and their impact on quality of life surrounding the operations, there will continue to be a demand for some sort of policy response to the odor issue. Most regulatory bodies continue to maintain that odor perception is too subjective to allow for effective, meaningful regulation. However, Minnesota has responded to odor concerns by setting standards for hydrogen sulfide emissions from livestock operations. (Experts differ in their views of whether hydrogen sulfide concentration and odor are closely correlated.)

In the event that odor limits are established, as they have been in Minnesota, the question of how the limits will be established remains a difficult one. In the absence of any clear link between odor (or

concentration of specific odor components) and public health, setting limits may be difficult. Even if some link is established (and recent research suggests that such a relationship may be observable), the question remains as to whether air standards will be set to protect the most sensitive members of the population or to respond to some average level of needed protection.

Finally, policy design is complicated as federal, state and local roles are debated. As with other environmental policy areas, some argue for an overriding federal policy to create a level playing field for industry and for residents living near the industry. However, as noted above, preferences vary widely region by region, suggesting that state and/or local responses would better serve the demand for policy response. Additionally, current federal statutes provide for regulation of water quality and water pollution, while many of the other issues are fueling the demand for a policy response.

Because of the demands for a response to fill the gaps left by a federal policy that has regulated only the very large animal operations, many states have developed unique and innovative programs to address concerns related to animal production. Oregon and Maryland are two states whose programs have been touted as particularly innovative. In contrast, some states continue to lag in their willingness and ability to enforce federal requirements, and they have not developed state programs which meet federal guidelines. Federal policy makers face several challenges in light of state-level activities. One of the most significant is how federal policy can create a level playing field when some states are already ahead in their program implementation. The challenge is to develop programs in such a way that recalcitrant states are brought in line with requirements without restricting the innovative and proactive states. For example, several states already require comprehensive nutrient management plans as part of their animal waste management regulations. As federal guidelines for comprehensive nutrient management plans are presented, these states will struggle with guidelines that differ from those already in place in their programs. Where states are the leaders in policy development, federal environmental policy is faced with catching up – a position to which federal regulators are not accustomed.

Policy developments at the local level further complicate the debate. In many states, where local governments exercise rural zoning authority, that authority is being used to address issues that federal and state regulations have not addressed. The use of local zoning ordinances to establish separation requirements for siting of animal operations has become quite common as an attempt to address odor, public health, and property value concerns. Several states have also established separation distances as part of their water quality permitting or waste management regulations. The result is conflict between state and local regulations, and an ongoing debate about where land use controls are appropriately exercised. Nowhere is this debate more heated than Michigan, where the state's right to farm law was recently amended to preempt, to a large degree, local zoning authority over animal agriculture.

Conclusions

The policy context for animal waste management is relatively easy to summarize but not so easy to address. Major changes in the industry, in demographics, and in property rights are creating a climate in which the public is actively demanding changes in animal waste management policy. Public concerns about animal waste management are driving changes in federal, state and local policy. Whether those changes will, in fact, address public concerns remains to be seen. The complexity of the animal waste management issue makes effective policy elusive. Federal or state environmental programs, with their

narrow focus on water quality, will not respond to the myriad of other public concerns. However, the diversity of programs at state and local levels, while perhaps more responsive to local preferences, creates problems for an industry seeking some consistency and certainty in the regulations with which it must comply. A patchwork of animal waste management and siting regulations and programs – like 50 little EPAs with different rules and regulations – is troublesome to an increasingly global industry. At the end of the day, the final challenge is to develop a unified set of policies, at the federal, state and local levels, which adequately address public concerns while recognizing the role of animal production in the agricultural sector. To paraphrase a New Yorker cartoon from some years ago, these are interesting times to be a policy analyst.

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