

COMMUNITIES, ANIMAL AGRICULTURE AND AIR POLLUTION:  
POLICY ISSUES AND OPTIONS FOR THE FUTURE<sup>1</sup>

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**Introduction.** The many products of animal agriculture are important to American consumers – of that there can be no question. Effective demand for meat and other animal products increases with income and is often used as an indicator of economic improvement for a population. Livestock production is a visible aspect of farming, and people appreciate farming for the various ways it contributes to the social and economic environment of a place. A recent Ohio survey revealed that 92% of all Ohioans agree that “farming contributes to the quality of life in Ohio,” with only 1% disagreeing (Sharp, 2003).

As with most things we value, however, animal agriculture also produces by-products that are distinctly undesirable. The trick is to balance the good with the bad. And typical of many environmental concerns, the problems with animal agriculture tend to be highly concentrated while the benefits are dispersed. Thus opponents of a certain concentrated animal feeding operation may mobilize to object, while the many consumers who enjoy the result of animal agriculture are inadequately motivated to rise in support.

This paper explores the policy issues and options surrounding one set of by-products from one type of animal feeding operation – air pollution from poultry. I come to this topic as a resource economist and rural policy specialist, not as an expert in poultry, animal agriculture or systems engineering. Starting with a brief sketch of the general policy process, I identify the air pollution issues with U.S. poultry production, the policy dimensions and future policy directions.

**Economy and Policy – The Basics.** All U.S. enterprise, including that related to animal agriculture, exists within a public policy setting. Markets for land, products, and services are really collections of rules that establish the rights and obligations of market participants. Land markets, for example, reflect the rights of land owners as well as the rights of other citizens affected by how land is used. Nobody’s rights are absolute, with limits established by the degree to which exercise of those rights impinges on the rights of others. Options available to a poultry producer are limited by the rights of others as defined by the structure of law and policy.

The structure of market rules varies over time and space, reflecting differing knowledge and preferences. Not all preferences are equal, of course, and those with similar attitudes about how a market should function may collectively press their case in the policy arena. The policy process is really about groups of like-minded citizens expressing their preferences for the rules and incentives that they feel should structure market choices. Thus, no market is beyond the reach of policy. The role of government in this mix is to support the results of changes to market rules, and structure the process by which collective preferences may emerge as future rule changes.

Poultry producers know that the rules and incentives within which they operate are under constant revision, reflecting changing expectations and the economics of production. But market rules are

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in constant flux for all of us – even college professors. That is the nature of things in a democracy.

**Poultry and Air Pollution.** The type and importance of the various air pollutants differ among major forms of animal agriculture. But the processes that generate air pollution from the care and feeding of farm birds and animals are fairly consistent among species. The primary pollutants are ammonia, methane, hydrogen sulfide, pathogens and volatile organic compounds from incomplete utilization of feed nutrients and decomposition of manure. There is also dust from feed and the animals themselves in the production facility, and odors (Williams, 2002; Sweeten, 2002; Thorne, 2002). All of those except odors are subject to objective measurement, though apparently with little research tying air pollution to specific production systems. Emission rates for a particular species within a given production system vary with time of day, topography, wind, humidity and other weather conditions. Pollutants from animal agriculture mingle with those from other sources to produce significant challenges to human and eco-system health both on and off the farm (Schiffman, et al. 2002).

Odors are a form of air pollution from poultry and other animal ag operations that is less easily measured. The smell of a large farm may be the first signal to a passer-by that something is happening to the air quality in the area. Stench is in the nose of the beholder, though there are objective measures of the concentrations of odorants in a cubic foot of air. Human response to various concentrations differs among individuals. There is evidence, however, of both physical and psychological consequences of odors from animal production and other sources. Odors *can* affect human health beyond just the aggravation (Thorne, 2002). In deciding how much animal odor is “reasonable,” samples may be tested by “sniffing specialists” who assign an odor rating based on their perception of the amount of clean air required to dissipate the odor (Hebert, 2004). Thus there is some semblance of scientific measurement of the inevitable smells of large scale animal production. North Carolina, North Dakota, Missouri, and Colorado have enacted odor regulations based on these qualitative responses to measured concentrations of odorants (Osterberg and Melvin, 2002). On September 22, 2004 Iowa established a benchmark standard of hydrogen sulfide concentration that would cause health problems, an action disputed by environmentalists and agricultural groups alike (Blaser, 2004)

**Policy Dimensions.** There are various aspects of animal agriculture under scrutiny in the policy process. All of them bear in some way on the problems of air pollution from poultry operations.

*Concentrated production.* Poultry production is one of the most integrated and concentrated of all agricultural industries. Some would argue that there is something inherently wrong with huge industrial production facilities for poultry and other farm commodities. These large facilities depart from a popular perception of the small, family-run farms that might raise chickens among other things. Flora, et al., have documented the deterioration of community trust and positive interaction associated with concentration of livestock operations (2002). Much of the support for Ohio farms documented by Sharp and colleagues is based on an image of a typical farm that does not include million bird egg production units.

Fewer but larger farms means that fewer people have a direct financial stake in production, and all of the undesirable by-products of the farm are more concentrated in certain areas. This is a prescription for complaints about farm-generated air pollution, from production as well as from the trucks and other heavy equipment required. Policies opposing industrial farm corporations

have been debated in many places, not just because of air pollution but also various other changes to the quality of rural life associated with the farm size.

*Balancing Private and Public Interests.* Improving air quality around poultry operations does not necessarily mean more regulations. Producers can make their own changes, and many non-farmers trust farmers to do what is necessary to protect their environment. Fifty-nine percent of respondents to Sharp's Ohio survey believe that farmers will do what is right for air and water quality (2003). Producers have a significant envelope of good will within the general public. They have the opportunity to maintain that positive image and avoid conflict, if they use it.

Sociologists refer to the formal and informal networks of relationships among neighbors in a community or neighborhood as "social capital." The greater the social capital and related mutual trust, the greater is the chance of avoiding conflict that leads to new regulations. If farmers and their neighbors truly understand their mutual needs and preferences there is opportunity for avoiding or resolving conflict. Differences of background and experience need not lead to conflict. Non-farmers need to understand the realities of modern agriculture and farmers must also learn what their non-farm neighbors expect out of life in the exurban area. One study of a changing rural area found that greater frequency of interaction between farmers and non-farmers was associated with fewer concerns about animal agriculture (Sharp and Tucker, 2003).

Comprehensive planning in an area can be a capital-building exercise that helps people see their common stake in the quality of life and how it can be protected (Libby and Sharp, 2003). There are less formal ways to build social capital as well, a pre-emptive approach to farm/non-farm conflict over the quality of rural life. Policy interventions may emphasize greater social networking as a strategy for reducing both the air quality problems and the fights about how much pollution is acceptable. Suits over the odor and other pollutants from a livestock or poultry operation can be destructive and costly for all concerned. The permitting process for large scale livestock units has often become a lightning rod for conflict and can seriously deteriorate whatever trust and social connection may have existed.

*Location Issues.* One obvious way to avoid the human cost of poultry-induced air pollution is by separating the farm from non-farm rural residences. Dispersion of pollutants is a viable strategy. Communities may guide the pattern of development in ways that reduce the incidence of conflict. A few states, notably Nebraska, have stringent local authority for regulating location of animal agriculture (Dahl, 2003). Other states deny townships and other local units the right to control livestock operations or exclude agriculture altogether, but there are ways to encourage farm location in some areas and discourage it in others.

There is plenty of evidence that proximity to large-scale animal agriculture can reduce the market value of a residential property. One of the first such studies found a 9% reduction in home value attributed to a hog facility within ½ mile of the home (Palmquist, Roka and Vukina, 1997). More recently, Ready and Abdalla (2003) found a 6.4% reduction in home value associated with location within .3 miles of a livestock facility in Berks County, Pennsylvania. Research in Iowa demonstrated that a livestock location upwind of homes resulted in an even greater reduction in home value (Herriges, Secchi and Babcock, 2003). So location does matter and is subject to local policy action. It just may be that large scale poultry production is incompatible with most housing development in rural areas. While farms are generally a positive aspect of rural aesthetics for non-farmers, large poultry and other livestock operations are exceptions. Land use planning and zoning must take these realities into account.

*Regulation.* Congress adopted the Clean Air Act in 1970 and established the Environmental Protection Agency (EPA) at about the same time to implement all environmental laws. Title V of the law targets stable and mobile sources of air pollution, requiring operating permits for those polluters labeled as “major sources.” Livestock operations have generally not been considered major sources for federal purposes, leaving states with the responsibility of promulgating rules necessary to achieve federal ambient air quality standards. States *may* if they choose adopt their own “State Implementation Plans” with regulations necessary to achieve the federal standards. Some, but certainly not all, states have their own regulations and many specifically exclude agriculture from coverage. Beyond the “major source” exemption, EPA rules for individual pollutants (ammonia and other nutrients, fumigants used in farming) exempt agriculture (Ruhl, 2000).

Environmental groups in California have sued to require that ozone reduction targets be achieved for the San Joaquin Valley, one of the most polluted areas in the country. Agriculture has been specifically exempted from the key Title V of the Clean Air Act by the state of California since 1976 because of the cost of compliance and the economic importance of the industry. EPA had been unable to determine the specific impact of agriculture on prevailing air quality making regulation difficult. But the pollution problems continue and EPA has asserted that the agricultural exemption by the state is a primary reason. Under a settlement agreement with the San Joaquin Valley Air Pollution Control District and the state, EPA has mandated that agriculture seek permits like other polluting sources and consider large farms as “major sources” under Title V of the Clean Air Act.. The California Farm Bureau has sued the EPA for overstepping its authority in mandating state controls to achieve federal standards, and is particularly concerned that the precedent may extend to other forms of pollutants and then to other states. Now the state legislature, under pressure from EPA, is reconsidering the 1976 agricultural exemption and a provision that would prevent the building of new homes and schools within 3 miles of existing livestock operations (Yengoyan, 2003).

EPA is beginning the process of establishing federal emission standards for livestock and poultry through the “safe harbor” program. Private companies would collect air quality data on their own operations to assist EPA in developing standards, and pay a one-time fee. In return, firms collecting those data would be immune from prosecution for violations of the Clean Air Act and other environmental laws while the data are being gathered (Janofsky, 2004). Better data are essential if emission standards are to work, and who can better gather those data than the farmers or operators themselves?

**Future Policy Directions.** All of the powers of government – to regulate, to spend, and to tax may be employed in seeking a more satisfactory balance among the public’s interest in clean air, their demand for the amenities of a rural home site and the economic realities of poultry production. Again, government’s role is to protect the rights of all citizens and to encourage or require private choices that acknowledge the rights of others. I suggest the following directions for modern poultry production.

*Acknowledge the Validity of the Issue.* The time is obviously past when “it smells like money” is an acceptable response to obvious air pollution from poultry, or anything else. Everyone knows that poultry manure smells and the evidence is clear that air pollutants, including those from agriculture, affect human health. Further, air pollution from poultry and other livestock imposes cost on others nearby. These are costs of production that are passed along to others, not borne by the producer. Reducing air pollution will mean that more of the costs that had gone to the neighbors will be part of the producers’ accounts. Higher production cost is a

necessary aspect of accepting responsibility for the realities of poultry production in rural America.

No one disagrees with the importance of better data for specific types of production systems, but too often demands for measurement precision is a shield to achieve delay or avoid responsibility. Groups on all sides of many issues have used that strategy. The “precautionary principle” fits here as well as in other areas where absolute certainty about impact or source may be illusive. We ask government to protect people from the reasonable possibility of harm. Participation in voluntary self-monitoring of air quality, and providing those data for development of defensible emission standards, is a forthright way to join the issue rather than pretending that it doesn’t exist.

*Build Social Capital.* Ohio, through the Ohio Livestock Coalition, has two important initiatives to improve relationships with people affected by the by-products of animal agriculture. Other states have similar programs. Livestock producers participate in the Livestock Environmental Assurance Program, improving their understanding of waste and nutrient management needs. The Ohio Livestock Coalition gives annual stewardship awards to farmers who demonstrate their commitment to reducing the “environmental footprint” of animal agriculture. And a new brochure directed at producers and their neighbors acknowledges the “It Takes Two to be a Good Neighbor.” Too often agriculturalists seem to blame the non-farm neighbor for not understanding farming, without making an effort to understand the neighbor. This program suggests ways to increase social capital in those rural communities. Building relationships takes time away from the business, but the return on that time could be higher than for just about anything else the farmer might do.

*Provide Incentives for Small Scale Production.* It makes little sense to regulate against the economies of size and scale in poultry production. Economic realities do matter in the structure of agriculture and cannot simply be declared illegal. On the other hand, communities or even states that want to encourage small and more diverse farms can certainly do so. Some consumers will pay a premium for product from a small local producer because they prefer the product and want to support local farmers. Signs for “fresh eggs” are common in many small rural towns. Massachusetts and several other northeastern states have special funding programs for helping farmers prepare business plans, seek new enterprises as the local economy changes, get started in farming and remain viable (American Farmland Trust, 2003). The 2002 Farm Bill authorizes federal support of state or local farm viability programs. Special incentives may be used to off-set the economic advantages of size.

Other incentives may come in the form of “green payments” for the environmental services provided by small farms that control pollution and provide countryside amenity. Claassen, et al. argue that incentive payments are the most efficient form of agro-environmental policy for the future (2001). The “conservation security program” of the 2002 Farm Bill could be the vehicle for such incentives.

Perhaps air pollution rights could be allocated among livestock producers in an area and a system for trading those rights be established. Air pollution rights are bought and sold among other major industries already and might be extended to livestock operations. Such systems require considerable data collection and farm level monitoring (Zilberman, Ogishi and Metcalf, 2002).

*Regulations.* Agriculture has enjoyed special status in major environmental laws (Ruhl, 2000). Many of these exemptions are based on the dispersed nature of farming, the difficulty of attributing environmental damage to specific farms and the relatively minor contributions which most farms make to large scale environmental issues. Concentrated livestock and poultry

production changes much of that, yet agriculturalists understandably try to maintain the exemptions. Maintaining the envelope of good will that farmers have long enjoyed will require more forthright involvement in regulatory programs already imposed on other industries. At least farmers should not expect special treatment if there is a clear cost to the health and well-being of others.

States will continue to be the key actors in air quality regulation. Livestock producers can demonstrate their good will by working with state agencies to develop reasonable measures and standards. A recent National Academies of Science report recommends that national odor standards be developed to support any future regulatory programs (2003). With more concentrated livestock production, greater regulation is inevitable and agriculture should assure that the rules are based on the best possible information. Better regulations can actually protect animal producers by establishing rational parameters for them to follow. Without these guidelines any perceived odor can produce a lawsuit. Producers in several states have formal agreements to undertake certain pollution controls and to help fund research for better waste treatment systems, as alternatives to regulation (Osterberg and Melvin, 2002).

Local land use zoning can be used effectively to avoid mixing concentrated poultry operations and rural residences. Enabling laws in some states are inadequate for designating areas as exclusively for farming and related land uses. Ohio only recently included “general welfare” as a basis for zoning. Until that language was added, townships and counties felt they had inadequate basis for protecting agricultural areas with only reference to “health, safety and morals” to work with. Selective spending for central water and sewer systems can also direct new residences toward areas without large industry, including animal agriculture. Simply exempting agriculture from local zoning does little to reduce conflict over air pollution and may not be in farmers’ best interest.

**Conclusions.** I would draw three overall conclusions about poultry and air quality improvement in the future.

First, we need to accept that large scale livestock production and rural homes simply do not mix. Yes, many people seem to prefer living in the country with all that open space around them. In fact, research shows that a residence located near some types of farms is worth more than a residence that does not have open space next door. But the economic effect is just the opposite when that farm next door is a huge poultry (or hog or dairy) operation. The old saw “the solution to pollution is dilution” applies here. Local comprehensive planning and zoning and infrastructure spending can avoid much of the problem by keeping residential development out of intensive farming areas.

Second, dispersion of air pollutants can help, but is not sufficient for the long term. There just will not be enough economically viable locations for livestock. And high levels of air pollution can damage the health of the farm family, farm workers and scattered near-by homeowners who may in fact be farmers themselves. There will be additional regulation to reduce air pollution and particularly odor from large scale animal agriculture. The public will demand greater protection and a few high visibility cases in recent years have heightened awareness of the downside of this important industry. Producers should cooperate fully in the provision of good data – it is in their interest to do so. And they can be better off with sound defensible regulations than with an “open season” on animal agriculture that seems to prevail today. Regulations will be state level, but with federal oversight. Innovative schemes for emission trading and green payments for smaller operations should be explored.

Third, poultry producers should work closely with various agricultural and other interest groups to build support for the production part of a sector that all value. Their operations should be open, they should participate in community planning and learn how they can be full members of the community. Defensiveness and complaints about being misunderstood and unloved will not work. This is about building community social capital, and it is 90% attitude – the sense that it is important to do. Livestock groups and university researchers and educators can help.

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