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Animal Agriculture in South Carolina: A Fact Book

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Economics of Regulating Animal Agriculture

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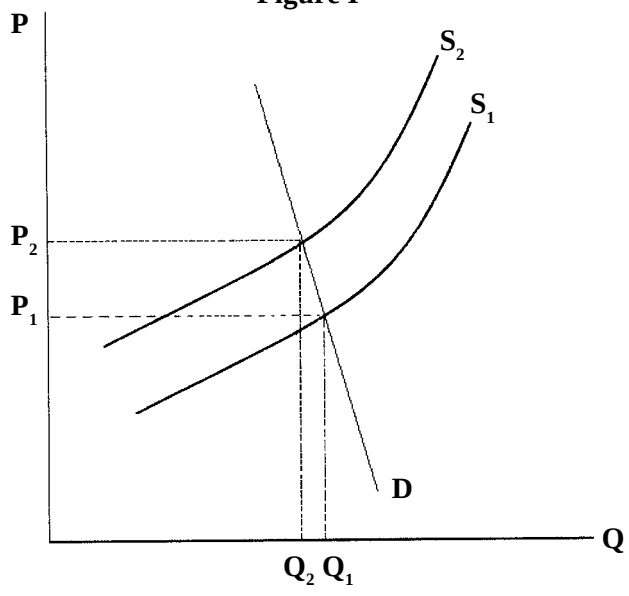
Stricter regulation of animal agriculture and other sources of nonpoint pollution is almost certain to occur in the next few years. "Industry" was targeted as the main pollution source for many years. But now that industrial pollution is under control to a greater or lesser extent, the problems of nonpoint pollution have become a key issue. Although agriculture has occupied a special place in American society over the centuries, recent trends have been to treat it no differently than other forms of production. The percentage of the American population living on and employed on farms has been in decline almost since the first settlers set foot on shore (except for a small deviation from trend in the 1930's and 1940's). This trend will continue. In fact the growth in the productivity of agriculture is in many ways the foundation on which the industrial revolution and now the information revolution have taken place[5]. If one American farmer couldn't feed so many people, fewer workers would be available to bring us all the other good things in life. But it has been difficult for the people still in agriculture to be subject to constant change without any chance of reaching a new equilibrium.

Despite the inevitability of change and the probability of increased regulation, farm groups will probably oppose new environmental regulations. However, studies have shown that new regulations and the threat of new regulations can be the catalyst for improved technology. And in some cases the new technology can reduce costs as well as pollution. (See Porter and van der Linde[6].) The first firms to discover and utilize new technologies can sometimes position themselves well market-wise while the others play catch up. South Carolina may be in a position for such benefits to the extent its new animal agriculture regulations anticipate potential Federal standards.

Farmers complain that they will be unable to pass along the costs of pollution control to their customers. While this would be true for any individual farmer, it would not be true for the industry as a whole. In economic jargon, the market demand for agricultural commodities tends to be inelastic. Wohlgenant[7] estimated own-price elasticities for animal food products to be between -.15 and -.76. This means that a 10-percent increase in the price will result in only a 1.5- to 7.6-percent decrease in consumption. So the demand for each individual group of animal food products is inelastic, and the demand for animal food products as a whole is even more inelastic as there are few substitutes for meat as a food group. Thus, the outcome of a cost-increasing new regulation would be an increase in price as illustrated in Figure I. Because of the inelastic nature of demand, aggregate income to farmers (P_2xQ_2) exceeds the original income level (P_1xQ_1). But it is important to note that in the transition to a new equilibrium, farms with the highest costs will go out of business.

Figure I



Others argue that in past cases when costs have risen, the farmers have borne the burden because the intermediaries did not raise prices paid to farmers. This should be a short-run phenomenon. Higher grain prices are usually a temporary problem and farmers will not make long-run resource allocation decisions based on them. And in the short run, it is hard to adjust animal numbers downward except by increasing marketings. This pushes animal prices down in the short run. But a permanent, long-run change in supply curves due to increased regulation should result in higher prices to producers that will cover most of the increased costs, though there may be some decrease in quantity.

There is even some possibility that regulations would decrease volatility in animal product markets. It would be more difficult to increase animal numbers in response to improved market conditions. This truncation of the upward swing of the hog cycle would dampen the crash that can result from overproduction.

In the extreme case where demand was perfectly inelastic, the equilibrium market quantity would not change and price would increase to cover all the costs of pollution reduction. While this is unlikely, the inelasticity of demand dictates that price would adjust more than quantity. Since everyone eats, the costs as well as the benefits of pollution reduction will be widely spread over the population.

If we look at world demand for United States animal food products, we will find it to be more elastic than domestic demand. Higher prices in the United States will have a bigger impact on exports than on domestic consumption, and some production will move overseas. While Americans benefit from low food prices when pollution regulation is lax, they do not directly benefit from low prices enjoyed by the rest of the world. So while the costs of pollution associated with domestically consumed products are partially offset by the benefits of lower food prices, this is not true for exported products. Thus, if regulations in the United States are stricter than in the rest of the world, exports will suffer just as differences in the strength of regulations between the states causes relocation of animal agriculture. Environmental concerns are likely to be a major focus of the next World Trade Organization negotiation round.

Perceptions are important to animal agriculture. The best way to avoid regulation is probably to be “good stewards” in the first place. The algae “bloom” in Lake Okechobee in Florida several years ago provided the impetus for stricter, costly regulation of dairies north of the lake. Similar pollution in the Chesapeake Bay may provide the motivation for new national standards. Even the National Pork Producers Council has come to see that animal agriculture regulation is inevitable and they are better off working with the regulators rather than against them. For example, the NPPC is sponsoring an Odor Solution Initiative Program. If increased regulation is inevitable, the best course for agriculture is probably to throw its energy behind finding new and innovative ways to protect the environment that are not prohibitively expensive. The land grant colleges and USDA are working along with commodity groups and agribusiness to find new methods of manure management.

Given the rising levels of “contracting” between farmers and meat processors, there is a role to be played by the large meat processors. They could take the lead in ensuring that their growers act in environmentally responsible ways. At least one processor is known to have removed hogs from a farm that did not follow the proper environmental controls as specified in their contract. Part of the $6 million settlement by Tyson Foods, Inc., in Maryland is the provision of $300,000 to about 240 contract chicken growers to control manure runoff.[8] Perhaps some sort of environmental “certification” program could be developed. Studies of other commodities have shown a willingness on the part of some consumers to pay a premium for items such as organic produce. The Clean Water Action Plan mentions the possibility of “Blue Water” labeling for agricultural products.

Pollution regulations must be carefully designed. Sunding[9] argues that regulations should not be uniform but should vary according to local conditions including season. USDA’s EPIC[10] (Erosion/Productivity Impact Calculator) model may be of use in designing regulations that can be customized for soil type, climate, proximity to waterways, etc. This could eliminate concerns that regulations will be based on only one region’s technological requirements.

Another idea is to tax inputs rather than outputs (Larson,et.al.[11]) They argue that taxes should be placed on the input with 1) the highest elasticity of demand with respect to price and 2) the highest elasticity of pollution with respect to input. This will be the most efficient input to tax and the welfare loss from not taxing all inputs may be

small. Shortle and Dunn[12] found that a tax or subsidy on management practices is more efficient than restrictions on management practices, or taxes or restrictions on runoff. Incentives for management practices are also more efficient when there are multiple sources of pollution or when risk aversion exists.

Griffin and Bromley[13] found that the amount of pollution in runoff could be estimated from production functions for individual farms given their production activities. If we could determine the nonpoint pollution production function for each farm, we could tax accordingly. Or perhaps we could set a number of pollution units allowed for an area (watershed?) and auction them off. An NCSU study[14] of a nutrient trading program under the Clean Air Act in the Tar-Pamlico River Basin indicates the potential value of such an approach. However, the basis of the current animal agriculture regulatory framework is "zero discharge," at least under normal operating conditions. This works against innovative concepts such as trading or selling nutrient emission rights—zero can't be traded.

When the activities of one group have a positive or negative impact on another (usually neighboring) group, economists call it an externality. Two kinds of externality that can be produced by animal agriculture and are of concern to citizens are water pollution and air pollution, often in the form of unpleasant odors. Even an unsightly farm would be considered an externality by many people. Together they can affect the quality of life and possibly long-term health. When a negative externality exists, someone is not paying the full costs of their activity. If a farmer uses clean water and then returns polluted water to the nation's waterways, he has not paid the full costs of using the water which would include returning it to its prior condition.

Often discussions of externalities are framed in terms of property rights. Does the farmer have the right to dirty the water or do the people downstream have the right to have clean water? Do farmers have the right to put foul odors into the air, or do the neighbors have the right to have clean air? Regulations tend to redistribute property rights and therefore create winners and losers. This is one reason why the government offers cost-sharing programs—to help offset the property rights losses incurred by farmers. A recent survey (June-November 1997) by the American Farmland Trust found that most farmers had not suffered any "loss of value due to government regulations such as zoning, erosion control, or wetlands protection." Two-thirds of the farmers surveyed were willing to pay part of the costs of protecting the environment as long as the general public also paid part.[15]

As reported in *Land Economics*, several professors conducted a study to identify and, if significant, to quantify the impact of large hog farms on property values in the surrounding area. They found that there is a significant effect on property values when a new hog operation is built. They found that the percentage change in property values depends on the distance of the farm from a house (greater distance=smaller change) and the amount of animal agriculture already in the area (less existing animal agriculture=bigger change.) For example, the predicted change in housing prices within 1/2 to 1 mile of a new hog operation ranged from -8.44 to -.29 percent depending on how many animals were already in the area. When a "middle" amount of animals already existed, the change was -4.75 percent.[16]

This may just sound like economic jargon. However, in Illinois, DeWitt County officials lowered assessments by 30 percent on houses within one and a half miles of a 7,400-sow farm. Homes within 2 miles had their assessments lowered by 10 percent.[17] If other counties follow this precedent, counties' revenues will be adversely affected.