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Fall/Winter, 2002

sustain

a journal of environmental and sustainability issues

The Kentucky Institute for the Environment and Sustainable Development

sustainablilty of industrialized agriculture

Commitment to Kentucky's Sustainable Environment

The shift in agricultural production practices from the small family farm, to large family corporate farms, to industrial farming practices has created major public issues in rural Kentucky. Most of this attention has focused on the establishment of confined animal feeding operations (CAFO's) and their potential environmental impacts. And the potential environmental impacts are enormous. CAFO's with thousands of cattle or swine, or hundreds of thousands of poultry, produce the waste equivalent of small to medium sized cities. Unlike traditional farms, CAFO's do not necessarily raise their own feedstock, relying instead on purchased feed. Consequently the animals are raised on relatively small acreage creating significant waste disposal issues. The major issues, however, from this shift in agricultural production practices lay with the impacts on people, society, public health, and economics. The sustainability of industrialized farming is the focus of interest to the Kentucky Institute for the Environment and Sustainable Development. The Institute, located at the University of Louisville, is devoting this issue of Sustain to CAFO's to better inform the public about this significant issue facing the state.

Wendell Berry, one of Kentucky's preeminent authors, describes the social issues surrounding the advent of CAFO's and industrialized farming. He argues for a return to the family farm as a means of preserving and protecting Kentucky's rural society, and a reliance on solar energy as the means of assuring a sustainable agricultural economy. Tom Fitzgerald, Director of the Kentucky Conservation Council and part-time Instructor of Law, describes the four-year battle to promulgate regulations to control the environmental impacts of large CAFO's. The regulations have been rejected by the Kentucky General Assembly which has prompted Governor Patton to invoke a legal suit challenging the constitutionality of the legislature's decades old power to veto state regulations. The battle pits the environmental community who view the larger industrial farms as food factories that need to be regulated against the independent agricultural community which to date has been self regulated and view the regulations as restrictive. Thomas Marcum, the State Resource Conservationist with the Natural Resources Conservation Service, addresses what steps the agricultural community must take to minimize environmental impacts associated with waste disposal. Recent research has demonstrated that land application, the most common and centuries old waste disposal technique, has its limitations. Serena Williams, Director of KIESD's Center for Environmental Law and Professor of Law, explores the use of nuisance laws as a means of controlling adverse impacts of CAFO's. The article by Margaret Mellon, Charles Benbrook and Karen Lutz Benbrook, with the Union of Concerned Scientists, is an executive summary of their January 2001 publication Hogging It! Estimates of Antimicrobial Abuse in Livestock. Their study points out that antimicrobial use in animals can substantially reduce the efficacy of the human antimicrobial arsenal. Continuous feeding of antibiotics to animals in confined areas is the norm and their use is increasing geometrically.

The next issue of Sustain, scheduled for Winter 2002, will focus on air quality in urban areas and its potential impacts on public health and the environment. The Institute welcomes any comment about the journal or suggestions for future issues.

Steven Myers, Ph.D.
Director of KIESD
University of Louisville

The Kentucky Institute for the Environment and Sustainable Development (KIESD) was created in July 1992 within the Office of the Vice President for Research, University of Louisville. The Institute provides a forum to conduct interdisciplinary research, applied scholarly analysis, pubic service and educational outreach on environmental and sustainable development issues at the local, state, national and international levels.

KIESD is comprised of eight thematic program centers: Environmental Education, Watershed Research, Environmental Law, Sustainable Urban Neighborhoods, Pollution Prevention, Environmental and Occupational Health Sciences, Environmental Policy and Management, and Environmental Engineering.

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Cover Photo: Taken by Scott Richards, E.Q.C. staff, in Bowling Green, Kentucky, Warren County

STUPIDITY IN CONCENTRATION

By
Wendell Berry

I. Confinement, Concentration, Separation

My task here is to show the great stupidity of industrial animal production. Factory farms, like this essay, have the aim of cramming as much as possible into as small a space as possible. To understand these animal factories, we need to keep in mind three principles: confinement, concentration, and separation.

The principle of confinement in so-called "animal science" is derived from the industrial version of efficiency. The designers of animal factories appear to have had in mind the example of concentration camps or prisons, the aim of which is to house and feed the greatest number in the smallest space at the least expense of money, labor, and attention. To subject innocent creatures to such treatment has long been recognized as heartless. Animal factories make an economic virtue of heartlessness toward domestic animals, to which humans owe instead a large debt of respect and gratitude.

The defenders of animal factories typically assume, or wish others to assume, that these facilities concentrate animals only. But that is not so. They also concentrate the excrement of the animals—which, when properly dispersed, is a valuable source of fertility, but, when concentrated, is at best a waste, at worst a poison.

Perhaps even more dangerous is the inevitability that large concentrations of animals will invite concentrations of disease organisms, which in turn require concentrated and continuous use of antibiotics. And there the issue enlarges beyond the ecological problem to what some scientists think of as an evolutionary problem: the animal factory becomes a breeding ground for treatment-resistant pathogens, exactly as large field monocultures become breeding grounds for pesticide-resistant pests.

To concentrate food-producing animals in large numbers in one place inevitably separates them from the sources of their feed. Pasture and barnyard animals are removed from their old places in the order of a diversified farm, where they roamed about in some freedom, foraging to a significant extent for their own food, grazing in open pastures, or recycling barnyard and household wastes. Confined in the pens of animal factories, they are made dependent almost exclusively upon grains which are grown in large monocultures, at a now generally recognized ecological cost, and which must be transported to the animals sometimes over long distances. Animal factories are energy-wasting enterprises flourishing in a time when we need to be thinking of energy conservation.

The industrialization of agriculture, by concentration and separation, overthrows the restraints inherent in the diversity and balance of healthy ecosystems and good farms. This results in an unprecedented capacity for over-production, which drives down farm income, which separates yet more farmers from their farms. For the independent farmers of the traditional small family farm, the animal factories substitute proletarian hired laborers, who at work are confined in the same unpleasant and unhealthy situation as the animals. Production at such a cost is temporary. The cost finally is diminishment of the human and ecological capacity to produce.

Animal factories ought to have been the subject of much government uneasiness, if government is really concerned about the welfare of the land and the people. But, instead, the confined animal feeding industry has been the beneficiary of government encouragement and government incentives. This is the result of a political brain disease that causes people in power to think that anything that makes more money or "creates jobs" is good.

We have animal factories, in other words, because of a governmental addiction to short-term economics. Short-term economics is the practice of making as much money as you can as fast as you can by any possible means while ignoring the long-term effects. Short-term economics is the economics of self-interest and greed. People who operate on the basis of short-term economics accumulate large "externalized" costs, which they charge to the future—that is to the world and to everybody's children and grandchildren.

People who are concerned about what their children and grandchildren will have to eat, drink, and breathe tend to be interested in long-term economics. Long-term economics involves a great deal besides the question of how to make a lot of money in a hurry. Long-term economists such as John Ikerd of the University of Missouri believe in applying "the Golden Rule across the generations—doing for future generations as we would have them do for us." Professor Ikerd says: "The three cornerstones of sustainability are ecological soundness, economic viability, and social justice" He thinks that animal factories are deficient by all three measures.

These factories raise issues of public health, of soil and water and air pollution, of the quality of human work, of the humane treatment of animals, of the proper ordering and conduct of agriculture, of the longevity and healthfulness of food production, and so on.

If the people in our state and national governments undertook to evaluate economic enterprises by the standards of long-term economics, they would have to employ their minds in actual thinking. For many of them, this would be a shattering experience, something altogether new, but it would also cause them to learn things and do things that would improve the lives of their constituents.

II. Factory Farms Versus Farms

Factory farms increase and concentrate the environmental risks of food production. This is a well-documented matter of fact. The rivers and estuaries of North Carolina, to use only one example, testify to how quickly a "private" animal factory can become and ecological catastrophe and a public liability.

A farm, on the other hand, disperses the environmental risks involved in food production. A good farm not only disperses these risks, but also minimizes them. On a good farm, ecological responsibility is inherent in proper methodologies of land management, and in correct balances between animals and acres, production and carrying capacity. A good farm does not put at risk the healthfulness of the land, the water, and the air.

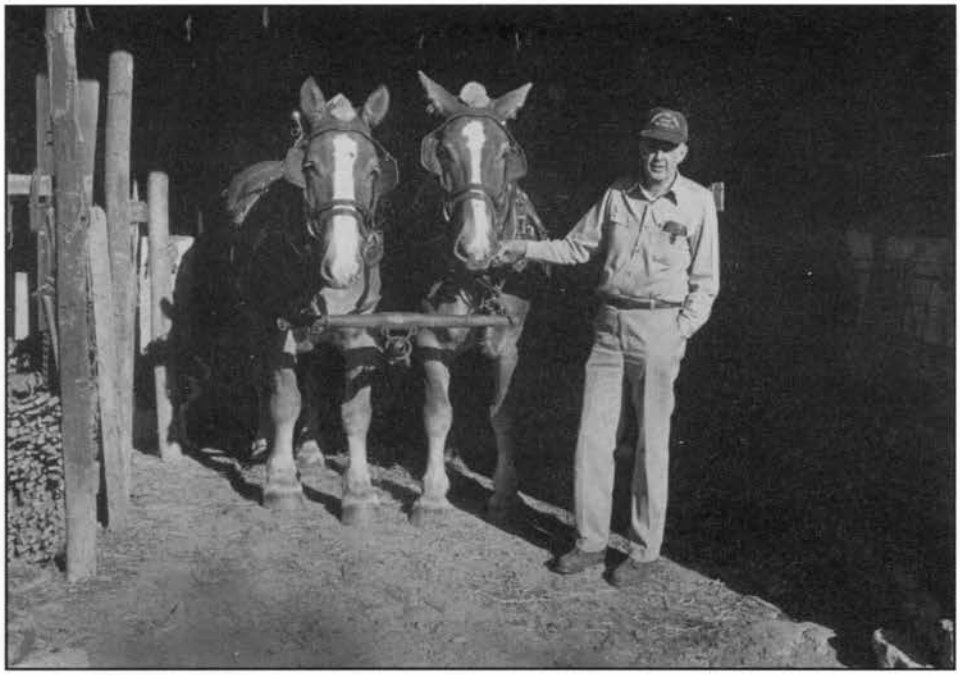
The ecological differences between a factory farm and a farm may be paramount in a time of rapidly accelerating destruction of the natural world. But there is an economic difference also that, from the standpoint of human communities, is critical.

A factory farm locks the farmer in at the bottom of a corporate hierarchy. In return for the assumption of great economic and other risks, the farmer is permitted to participate minimally in the industry's earnings. In return, moreover, for the security of a contract with the corporation, the farmer gives up the farm's diversity and versatility, reducing it to a specialist operation with one use.

According to one company's projections, a farmer would buy into the broiler business at a cost of $624,275. That would be for four houses that would produce 506,000 birds per year. Under the company's terms, this investment would produce a yearly net income of $23,762. That would be an annual return on investment of 3.8%.

I don't know what percentage of annual return this company's shareholders expect to realize from their investment. I do know that if it is not substantially better than the farmer's percentage, they would be well advised to sell out and invest in certificates of deposit.

The factory farm, rather than serving the farm family and the local community, is an economic siphon, sucking value out of the local landscape and the local community into bank accounts elsewhere.



To entice them to buy Kentuckians' work and products so cheaply, our government has given the animal confinement corporations some $200 million in state and federal tax "incentives." In gratitude for these gifts, these corporations now wish to be relieved of any mandated public liability or responsibility for their activities here.

I don't know that the arrogance and impudence of this has been equaled by any other industry. For not only have these people demonstrated, by their contempt for laws and regulations here and elsewhere, their intention to be bad neighbors; they now come before our elected representatives to ask for special exemptions. But in that very request they acknowledge the great risks and dangers that are involved in their way of doing business. Why should the innocent, why should people with a good conscience, want to be exempt from liability?

It is clear that the advocates of factory farming are not advocates of farming. They do not speak for farmers.

What they support is state-sponsored colonialism—government of, by, and for the corporations.

III. Sustainability

The word "sustainable" is well on its way to becoming a label, like the word "organic." And so I want to propose a definition of "sustainable agriculture." This phrase, I suggest, can only refer to a way of farming that can be continued indefinitely because it conforms to the terms imposed upon it by the nature of places and the nature of people.

Our present agriculture, in general, is not ecologically sustainable now, and it is a long way from becoming so. It is too toxic. It is too dependent on fossil fuels. It is too wasteful of soil, of soil fertility, and of water. It is destructive of the health of the natural systems that surround and support our economic life. And it is destructive of genetic diversity, both domestic and wild.

So far, these problems have not received enough attention from the news media or politicians, but the day is coming when they will. A great many people who know about agriculture are worrying about these problems already. It seems likely that the public, increasingly conscious of the issues of personal and ecological health, will sooner or later force the political leadership to pay attention. And a lot of farmers and grassroots farm organizations are now taking seriously the problem of ecological sustainability.

But there is a related issue that is even more neglected, one that has been largely obscured, even for people aware of the requirement of ecological sustainability, by the vogue of the so-called "free market" and the global economy. I am talking about the issue of the economic sustainability of farms and farmers, farm families and farm communities.

It ought to be obvious that in order to have sustainable agriculture, you have got to make sustainable the lives and livelihoods of the people who do the work. The land cannot thrive if the people who are its users and caretakers do not thrive. Ecological sustainability requires a complex local culture as the preserver of the necessary knowledge and skill; and this in turn requires a settled, stable, prosperous local population of farmers and other land users. It ought to be obvious that agriculture cannot be made sustainable by a dwindling population of economically depressed farmers and a growing population of migrant workers.

Why is our farm population dwindling away? Why are the still-surviving farms so frequently in desperate economic

circumstances? Why is the suicide rate among farmers three times that of the country as a whole?

There is one reason that is paramount: The present agricultural economy, as designed by the agribusiness corporations (and the politicians, bureaucrats, economists, and experts who do their bidding) uses farmers as expendable "resources" in the process of production, the same way it uses the topsoil, the ground water, and the ecological integrity of farm landscapes.

From the standpoint of sustainability, either of farmland or farm people, the present agricultural economy is a failure. It is, in fact, a catastrophe. And there is no use in thinking that agriculture can become sustainable by better adapting to the terms imposed by this economy. That is hopeless, because its terms are the wrong terms. The purpose of this economy is rapid, short-term exploitation, not sustainability.

The story we are in now is exactly the same story we have been in for the last hundred years. It is the story of a fundamental conflict between the interests of farmers and farming and the interests of the agribusiness corporations. It is useless to suppose or pretend that this conflict does not exist, or to hope that you can somehow serve both sides at once. The interests are different, they are in conflict, and you have to get on one side or the other.

As a case in point, let us consider the economics of Kentucky's chicken factories, which some are pleased to look upon as a help to farmers. The Courier-Journal on May 28, 2000 told the story of a McLean County farmer who raises 1.2 million chickens a year. His borrowed investment of $750,000 brings him an annual income of $20,000 to $30,000. This declares itself immediately as a "deal" tailor-made for desperate farmers. Who besides a desperate farmer would see $20,000 or $30,000 as an acceptable annual return on an investment of $750,000 plus a year's work? In the poultry-processing corporations that sponsor such so-called "farming," how many CEOs would see that as an acceptable return? The fact is that agriculture cannot be made sustainable in this way. The ecological risks are high, and the economic structure is forbidding. How many children of farmers in such an arrangement will want to farm?

Some people would like to claim that this sort of "economic development" is "inevitable." But the only things that seem inevitable about it are the corporate greed that motivates it and the careerism of the academic experts who try to justify it. On May 28, The Courier-Journal quoted an agribusiness apologist at the University of Kentucky's experiment station in Princeton, Gary Parker, who said in defense of the animal factories: "Agriculture is a high-volume, high-cost, high-risk type business. You have to borrow a tremendous amount of money. You have to generate a tremendous amount of income just to barely make a living."

The first problem with Mr. Parker's justification is that it amounts to a perfect condemnation of this kind of agriculture. In an editorial on June 4, The Courier-Journal quoted Mr. Parker, and then said that such agriculture, though compromising and risky, "can generate great rewards." The Courier-Journal did not say who would get those "great rewards." We may be sure, however, that they will not go to the farmers who, according to Mr. Parker's confession, are just barely making a living.

The second problem with Mr. Parker's statement is that it is not necessarily true. For sixty ears the purpose of the Burley Tobacco Growers Cooperative Association has been to protect farmers from such all-out exploitation. More recently, the purpose of that organization, of the Commodity Growers Cooperative, of Partners for Family Farms, and of the Community Farm Alliance, has been to find ways for our small diversified family farms to survive as such. This effort has not yet achieved anything like the good years of the tobacco economy; nevertheless, it is working in support of a possibility and a hope that are authentic, and it is beginning to collect its share of success stories.

For example, in contrast to the factory farm that realizes a profit of $20,000 or $30,000 on the sale of 1,200,000 chickens, I know a farm family who last year, as a part of a diversified small farm enterprise, produced 2,000 pastured chickens for a net income of $6,000. This farm enterprise involved no large investment for housing or equipment, no large debt, no contract, and no environmental risk. The chickens were of excellent quality. The customers for them were ordinary citizens, about half of whom were from the local rural community. The demand far exceeds the supply. Most of the proceeds for these chickens went to the family that did the work of producing them. A substantial portion of that money will be spent in the local community. Such a possibility has not been noticed by Mr. Parker or The Courier-Journal because, I suppose, it is not "tremendous" and it serves the interest of farmers, not corporations.

Wendell Berry is a poet and novelist and is also the author of several books of essays including The Unsettling of America, Another Turn of the Crank, and Life Is A Miracle. He and his wife Tanya Berry have lived on and farm, a small farm in Henry Co., Kentucky, since 1965.

Addressing Animal Waste Problems Associated with Animal Feeding Operations: The Natural Resources Conservation Service Approach

By
Thomas C. Marcum, State Resource Conservationist,
Natural Resources Conservation Service

The focus of the Natural Resources Conservation (NRCS) has shifted in the 66 years of its existence to address changing public concerns and resource problems. NRCS is the only federal agency that provides direct on-site assistance to landowners in conserving and preserving the Nation's environment. The agency was originally created as the Soil Conservation Service (SCS) in 1935 as a result of the Dust Bowl to assist local conservation districts in controlling soil erosion caused by water as well as by wind.

Since that time, SCS (currently NRCS) helped landowners across the country in protecting the environment from adverse impacts due to soil erosion, primarily on cropland. In addition, the agency has had many initiatives that improved the resource base and increase landowner's standards of living. Technical assistance is provided to farmers in developing resource management systems on pastureland, forestland, hayland, and wildlifeland. NRCS continues today to offer multi-resource planning and application assistance to landowners on a voluntary basis.

Animal waste systems have also been a major part of the workload for NRCS personnel. They have focused primarily on systems on structural designs for temporary storage. Land treatment components and nutrient management plans were also major considerations in system development. However, the level of detail and magnitude of resource considerations in total system development has changed due to public concerns and advances in technology.

ANIMAL FEEDING OPERATION SITUATION OVERVIEW

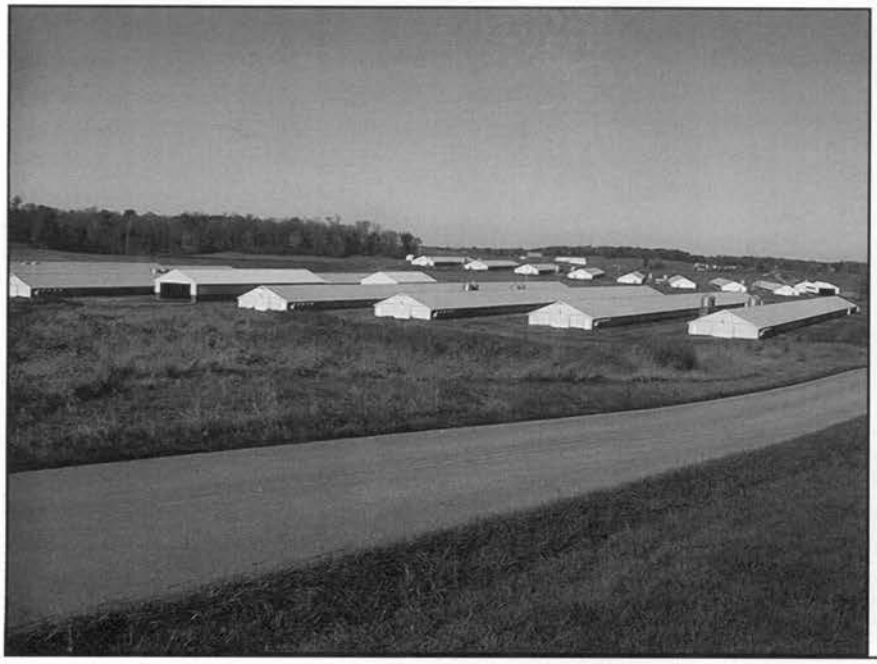
According to the Environmental Protection Agency (EPA), despite tremendous progress, 40 percent of the Nation's waterways assessed still do not meet goals for fishing, swimming, or both, even though pollution from factories and sewage treatment plants has been dramatically reduced. These are point sources, or sources that can be traced to a concentrated outlet such as a pipe, and can be relatively easy to identify. Pollution from animal feeding operations (AFOs) along with runoff from city streets and agricultural activities continues to degrade the environment and puts drinking water at risk. These are defined as non-point sources of pollution, or those that have a diffuse source, and can be difficult to identify especially those from AFOs.

Recent changes in the animal production industries have been substantial. In terms of production, the total number of animal units (AUs) in the U.S. increased by about 4.5 million (approximately three percent) between 1987 and 1992. During this same period, however, the number of AFOs decreased, indicating a consolidation within the industry overall and greater production from fewer, larger AFOs.

Confined animals in 1997 were more spatially concentrated in high production areas as compared to 1982. North Carolina and midwestern states have experienced increases in swine operations while poultry operations have increased in the southeastern states. Kentucky has witnessed a significant increase in the number of confined animal feeding operations (CAFOs) within the past few years, primarily in the poultry industry. The number of broilers has increased from 22 million in 1992 to 188 million in 1999. There are an estimated 250 CAFOs in Kentucky (12,660 in the U.S.), 90 percent of which are in the western region of the state. McLean County has the largest number with 36. Eighty six percent of McLean County's CAFOs are poultry operations.

Along with the changes in AFOs, there is greater public awareness from visible environmental impacts of increased nutrient, pathogen, and organic loading; plus odors, ammonia gases, and pests. In addition, there have been instances of improper facilities' construction and management and instances of land application of animal manure at excessive rates.

NRCS recognizes that a strong livestock industry is essential to the countries' economic stability, the livelihood of many rural citizens, and sustainability of a high quality food supply for the American public. It is also recognized that livestock producers are primary stewards of our natural resources and will be the key to successful protection of the environment in the future. NRCS maintains a trust relationship with AFO operators and will continue to assist them in meeting the environmental challenges. In order to accomplish this, a well-planned strategy is needed.



RESPONSE TO THE SITUATION

NRCS has made key decisions as part of the agencies' strategy. Conservation planning policies have been revised to incorporate a certification process for personnel assisting AFO producers with waste system planning and designs. Certification will ensure personnel are technically competent in planning animal waste systems that vary widely in complexity. National and state field office technical practice standards for nutrient management and waste utilization have been revised to incorporate advances in technology and research findings. The most notable change in the nutrient management standard is the provision for applying nutrients according to phosphorus. Each state worked with land grant universities to establish a phosphorus threshold based on soil test. The threshold then triggers applying nutrients based on phosphorus rather than nitrogen. Kentucky has established a phosphorus threshold test level of 400 based on the limited research that was available in the state.

These changes in policies and standards have prompted the need for technical training related to planning systems for AFOs. Rigorous training requirements for certification have been set by national and state policies including conservation planning procedures, water quality, structure designs, land treatment measures, and nutrient management.

An estimated 272,600 AFOs are projected to be planned by 2009. NRCS cannot handle this workload because of declining budgets and workload demands in other areas. Therefore, partnering agencies and organizations are offered the same training and certification as NRCS personnel to help relieve the workload.

In February 1998, President Clinton released the Clean Water Action Plan (CWAP), which provides a blueprint for restoring and protecting water quality across the Nation. As part of this effort, the CWAP called for the development of a USDA-EPA unified national strategy to minimize the water quality and public health impacts of AFOs. This strategy is based on existing programs and regulatory authorities.

NRCS's goal is for animal feeding operation (AFO) owners/operators to take voluntary actions to minimize potential water pollutants from confinement facilities and land application of manure and organic by-products. To accomplish this goal, it is a national expectation that all AFOs should develop and implement

technically sound, economically feasible, and site-specific Comprehensive Nutrient Management Plans (CNMP).

In general terms, a CNMP identifies management and conservation actions that will be followed to meet clearly defined soil and water conservation goals, including nutrient management. Defining soil and water conservation goals and identifying measures and schedules for attaining the goals are critical to reducing threats to water quality and public health from AFOs. The CNMP should fit within the total resource management objectives of the entire farm/animal feeding operation.

The objective of a CNMP is to provide AFO owners/operators with a plan to manage manure and organic by-products by combining conservation practices and management activities into a conservation system that, when implemented, will protect or improve water quality.

CNMP ELEMENTS

Following are CNMP elements that need to be considered by the owner/operator during plan development:

1. Manure and Wastewater Handling and Storage
2. Land Treatment Practices
3. Nutrient Management
4. Record Keeping
5. Feed Management
6. Other Utilization Activities

It is essential that planners understand the elements of a CNMP and the respective components, practices, and considerations that are associated with each. The following is a summary of each element that must be incorporated and/or considered in the development of a CNMP.

Manure and Wastewater Handling and Storage

This element addresses the components and activities associated with the production facility, feedlot, manure and wastewater storage and treatment structures and areas, and any areas used to facilitate transfer of manure and wastewater. In most situations, addressing this element will require a combination of conservation practices and management activities to meet the production needs of the AFO owner/operator and environmental concerns associated with the production facility. Adequate planning and design of this CNMP component requires in-depth knowledge and experience in surveying site locations and designing structural components.

The manure and wastewater handling and storage facility should provide for adequate collection, storage, and/or treatment of manure and organic by-products that allows application during favorable weather conditions and at times compatible with crop management.

Collection devices include scraper, pipe, diversion, and liquid flush systems. A variety of transferring pumps and other types of conveyance equipment is available for transferring liquid and solid manure to storage and to land application equipment. Runoff above the collection and storage areas is diverted to keep it from flowing across the lot and becoming contaminated.

Storage components are temporary holding facilities for manure before it is spread on land. These structures are designed for 120 day to 1 year storage periods. Systems range from earthen storage, including lagoons for long-term manure storage, to above ground and below ground facilities, which may be within a building. Below ground storage within a building is common in the swine industry. Use of slotted floors above the storage facility improves the efficiency of manure collection and storage through direct deposit of manure into storage. Groundwater contamination is a primary concern for earthen storage structures where soils have unacceptably high infiltration rates. The planning process should include a detailed soils investigation by a qualified soil scientist and/or geologist to determine if preventive measures are needed. Alternatives such as plastic liners for other membranes placed in the bottom and sides of an earthen structure may be required.

AFO operators/owners need to consider the impact of selected conservation practices on air quality during the waste system planning process. Air quality in and around structures, waste storage areas and treatment sites may be impaired by excessive dust, gaseous emissions such as ammonia, and odors. Proper siting of structures and waste storage facilities can enhance dispersion and dilution of odorous gases. Residential areas, churches, public roads, etc. should be taken into consideration when siting facilities and application areas.

Land Treatment Practices

This element addresses evaluation and implementation of appropriate conservation practices on sites proposed for land application of manure and organic by-products from an AFO. On fields where manure and organic by-products are applied as beneficial nutrients, it is essential that runoff and soil erosion be minimized to allow for plant uptake of nutrients. An

understanding of the present land use is essential in developing a conservation system to address runoff and soil erosion.

An on-site visit is required to identify existing and potential natural resource concerns, problems, and opportunities for fields where animal by-products are applied. Training and experience is required in order to identify the relationships of land features and land use that pose potentials for nitrogen or phosphorus losses from the site. Identification of sensitive areas such as sinkholes, streams, springs, lakes, ponds, wells, gullies, and drinking water sources is essential. Risks can be mitigated by applying a combination of conservation practices and management activities. The planner however, should always keep in mind that implementation of one practice or activity could possibly increase or decrease reductions by application of another option.

Application methods, rates, and timing are key components of a waste management system. Of the application methods, incorporation offers the least hazard for runoff losses. Surface applied and not incorporated is the most common method, but the risk of runoff losses is higher, especially on sloping land with no residue or plant cover. Producers need to consider the timing of expected rainstorms because the first storm after application of wastes will generally result in the highest concentrations in runoff. Careful planning is required to ensure structures contain the volume of wastes to balance nutrient requirements of the crop when it is needed. Of all the management factors that affect nutrient concentrations, the rate of application is the most direct and usually has the greatest effect. A rate of 10 tons/acre for solids and one-half acre/inch for liquids is acceptable provided other mitigation practices are in place.

Conservation tillage (reduced tillage or mulch tillage) and no-till significantly reduce runoff and erosion. The reduction in runoff and erosion expected with conservation tillage reduces detachment and transport, and therefore losses of nutrients. Advantages besides erosion control include reduced time and energy inputs for tillage. This practice has the most potential for reducing losses in runoff when soil, slope, and weather conditions are subject to erosion when surface soil is high in nutrients, especially phosphorus. However, no-till and conservation tillage may make it difficult to inject manure.

Structural practices, such as terraces and diversions, can reduce the transport of nutrients by reducing sediment transport and runoff. Constructed wetlands have the potential to remove nutrients dissolved in water and associated with sediment in surface runoff. Retention time or travel time of flow through a wetland is important. The longer the travel times, the more likely dissolved chemicals will be removed.

Buffer strips are effective components of a waste management system in reducing threats to water quality degradation. There are two types of vegetative buffers: filter strips and riparian forest buffers. A vegetative filter strip is a buffer strip planted to grass or some other close-grown plants, normally of a forage type. A riparian forest buffer is an area of trees, shrubs and grasses located adjacent to and up-gradient from water bodies. The purpose of the buffers is to remove nutrients and pesticides in solution or associated with sediment from runoff by filtration, deposition, infiltration, adsorption, decomposition, and/or volatilization. By both slowing runoff velocity and providing more biological surface area (living and dead) for interaction, the buffer is efficient in reducing the field-to-stream transport of nutrients. To be effective, runoff must not concentrate, but must pass through the vegetation in nearly uniform sheet flow. The vegetation must be erosion and pesticide resistant. The lower the ratio of contributing watershed area to filter strip area, the longer the contact time and the greater the removal efficiency.

Grassed waterways are a type of vegetative filter with a different orientation relative to inflow and outflow directions and have a different purpose. Grassed waterways are generally designed to protect areas of concentrated water flow and transport runoff to a safe point of discharge without erosion. The grassed waterway acts as a vegetated filter strip as runoff enters from each side, with decreasing function as a filter as flow concentrates in the bottom of the channel. Because waterways have a much greater ratio of watershed to grassed areas, they are less effective than filter strips or riparian forest buffers in reducing transport of nutrients.

Nutrient Management

This element addresses the requirements for land application of all nutrients and organic by-products (e.g., animal manure, wastewater, commercial fertilizers, crop residues, legume credits, irrigation water, etc.) that must be evaluated and documented for each field. Land application of manure and organic by-products is the most common method of manure use because of the nutrients and organic matter content of the material. Land application procedures must be planned and implemented in a way that reduces potential adverse affects to the environment and public health.

Modern agriculture depends on an adequate supply of nutrients available to the crops for high levels of production. A major part of the yield increases during the last 50 years can be attributed to high levels of crop nutrition that support high

yielding crop varieties. An abundant supply of nutrients, particularly nitrogen and phosphorus, is credited with an abundant food, fiber, and forage supply. Plants depend on nutrients for growth, and in turn supply nutrients back to the environment. Without plants and the nutrients associated with their growth, there would be no livable environment.

Animal manure and other organic material contains valuable crop and soil nutrients. The nutrients are in waste feed material, manure, bedding, and animal parts. These by-products of animal operations have nitrogen, phosphorus, and potassium levels high enough to be used as soil amendments and nutrient supply for crops. Waste products are also a source of organic material and micronutrients to support soil organic matter and crop nutrient needs. Animal manure contains from 0.1 to 4.0 percent of the major plant available nutrients, nitrogen, phosphorus and potassium (N, P and K). A wide range of nutrient content values is in agricultural waste products. Onsite sampling and laboratory analysis of waste products immediately before land application and utilization are the best way to determine nutrient content. The University of Kentucky and NRCS have published book values for the nutrient contents of various agricultural by-products. These book values have been compiled from research and field inventories. These book values are used in the Kentucky Nutrient Management Standard for use in developing nutrient management plans for AFOs when manure analysis has not been done, primarily in new operations.

Chicken litter stockpile prior to land incorporation

Nutrients contained in the waste by-product may or may not be plant available during the year of land application. Nitrogen is only partly plant available during the first crop season. Most of the ammonium nitrogen (NH_4^+-N) is plant available. The organic portion of nitrogen becomes gradually available during decomposition of the waste product and mineralization of the nitrogen.

Ratios of nitrogen, phosphorus, and potassium found in animal manure vary with animal species, feed content, and storage method. Generally, manure ratios of plant available N-P_2O_5-K_2O are between 3-2-3 and 2-1-2. This is in contrast to the plant's required nutrient ratios for growth, which is between 8-1-3 and 3-1-2. Thus, there is an imbalance between the nutrient requirements of the crop and the nutrient supply in the agricultural waste product. A decision must be made as to which nutrient should be selected to supply adequate material to the soil and crop and what other nutrient material will be applied in the form of commercial fertilizer to complete the crop's nutrient needs. Overapplication of nutrients to the soil and crop system is not an acceptable resource management practice. Levels of nutrients in the soil greater than the crop requirements have potential for offsite movement and contamination of soil, air, and water resources.

One difficult waste management problem occurs in handling and using animal manure. The growth and concentration of the livestock industry have created large supplies of animal nutrients in small land areas. Dealing with animal manure production for land application and nutrient use is an issue in many parts of the country. A balance must be reached between the crop nutrient requirement of a region and the livestock manure produced in that region. While crops use nutrients mainly during the growing season, animal manure and other agricultural by-products are produced year-round. This creates an accumulation of nutrients until the next opportunity for field application and crop growth. Because application of these products requires special equipment and usually full access to the crop field, there is some limitation to when the material can be applied. Timing of the nutrient release from this field-applied organic material may or may not coincide with the crop requirements. While the maturing and harvest of crops will in most cases end the crop's nutrient uptake and use, it does not stop the soil processes that continue to decompose organic forms and mineralize nutrients. Continued availability of nutrients within the soil after crop harvest may lead to contamination of the air, water, and soil resources. Careful management of the rate, timing, and method of application of organic materials is essential to make the best use of the nutrients and reduce to the extent possible any excesses that could find a way to enter resource sensitive areas.

When manure or other organic material is used as a nutrient source, odors can be a problem. Under certain atmospheric conditions (warm temperatures, high humidity, light winds), strong odors can be released from surface-applied material, so application should be avoided under these conditions if possible. Incorporating the manure soon after application can reduce odors. Use of an injector applicator instead of spreading on the surface is recommended. Applying this material when the wind is blowing enough to disperse the odor also helps.

A drawback to incorporation of organic nutrient sources is that it not only buries manure, it also buries crop residue. This may conflict with an existing residue management system on the farm. Chisel plows with twisted points can bury up to 55 percent of residue on the surface. A one-way disk can bury up to 70 percent of crop residue, and a tandem disk up to 50 percent of residue on the surface. These issues need to be resolved in the planning process, if possible.

Some options that could be used are:

1. Plan manure application for the fields that have the least potential for sheet and rill erosion and, therefore, have less need for residue management.
2. Develop the erosion control system using other conservation practices, such as contour farming or buffers, that do not rely on crop residue.

If the quantity of manure exceeds the farm's capacity to use all the manure nutrients in an efficient and environmentally safe manner, alternative methods of use must be found. Some possible alternatives include:

- Acquiring more land for application.
- Reallocating land to the existing lands.
- Trading or selling to neighbors.
- Reducing livestock numbers.
- Producing a value-added product, such as compost, feedstuff, or combustible material.

Record Keeping

It is important that records be kept to effectively document and demonstrate implementation activities associated with CNMPs. Documentation of management and implementation activities associated with a CNMP provides valuable benchmark information for the AFO owner/operator that can be used to adjust his/her CNMP to better meet production objectives. It is the responsibility of AFO owners/operators to maintain records that document the implementation of CNMPs.

Documentation should include:
Annual manure tests for nutrient contents for each storage facility
Application records for each application event, including:
Containment source or type and form of commercial fertilizer

Field(s) where manure or organic by-products are applied

Amount applied per acre

Time and date of application

Weather conditions during nutrient application

General soil moisture condition at time of application (i.e., saturated, wet, moist, dry)

Feed Management

Feed management activities may be used to reduce the nutrient content of manure, which may result in less land being required to effectively use the manure. Feed management activities may be dealt with as a planning consideration and not as a requirement that addresses specific criteria. However, AFO owners/operators are encouraged to incorporate feed management as part of their nutrient management strategy. Specific information and recommendations should be obtained from Land Grant Universities, industry, the Agricultural Research Service, or professional societies such as the Federation of Animal Science Societies (FASS) or American Registry of Professional Animal Scientists (ARPAS), or other technically qualified entities.

An example of the effective use of feed management is the following: "If a dairy cow is fed 0.04 percent above recommended levels of dietary phosphorus, she will excrete an additional six pounds of phosphorus annually. For a herd of 500 cows, this is an additional 3,000 pounds of phosphorus per year. In a single cropping system, corn silage is about 0.2 percent phosphorus on a dry matter basis. For a field yielding 30 tons of silage per acre, at 30 percent dry matter, this is 36 pounds of phosphorus in the crop. If an additional 3,000 pounds of phosphorus are recovered in manure, it takes considerably more land for application if manure is applied on a phosphorus basis." (Dr. Deanne Meyer, Livestock Waste Management Specialist, Cooperative Extension, University of California.)

Specific feed management activities to address nutrient reduction in manure may include phase feeding, amino acid

supplemented low crude protein diets, and the use of low phytin phosphorus grain and enzymes, such as phytase or other additives. Feed management can be an effective approach to addressing excess nutrient production and should be encouraged; however, it is also recognized that feed management may not be a viable or acceptable alternative for all AFOs. A professional animal nutritionist should be consulted before making any recommendations associated with feed ration adjustment.

Other Safe Activities

Using environmentally-safe alternatives to land application of manure and organic by-products could be an integral part of the overall CNMP. Alternative uses are needed for animal manure in areas where nutrient supply exceeds available land and/or where land application would cause significant environmental risk. Manure use for energy production, including burning, methane generation and conversion to other fuels, is being investigated and even commercially tested as a viable source of energy. Methods to reduce the weight, volume, or form of manure, such as composting or pelletizing, can reduce transportation cost, and create a more valuable product. Manure can be mixed or co-composted with industrial or municipal by-products to produce value-added material for specialized uses. Transportation options are needed to move manure from areas of over supply to areas with nutrient deficiencies, a procedure called manure brokering.

As many of these alternatives to conventional manure management activities have not been fully developed or refined, industry standards do not always exist that provide for their consistent implementation. Except for the NRCS conservation practice standard Composting Facility (Code 317), NRCS does not have conservation practice standards that address these other use options. This element of a CNMP should be presented as a consideration for the AFO owner/operators in their decision-making process. No specific criteria need to be addressed unless an alternative use option is decided upon by the AFO owner/operator. When an AFO owner/operator implements this element, applicable industry standards and all federal, State, and local regulations must be met.

Integration of CNMP Elements

Many conservation practices are used together to make up a waste management system. Resource management systems consist of the proper combination of conservation practices needed to solve identified resource problems. How these practices interact is important to the overall effectiveness of the system. The planner must be aware of these interactions so that the system will function as designed.

References:

USDA-Natural Resources Conservation Service, 1992, National Engineering Handbook, Agricultural Waste Management Field Handbook, Part 651

Natural Resources Conservation Service Field Office Technical Guide, Practice Standards:
Filter Strip (393)
Nutrient Management (590)
Riparian Forest Buffer (391)

USDA-Natural Resources Conservation Service, August 1999, CORE4 Conservation Practices,

USDA-Natural Resources Conservation Service, December 2000, Comprehensive Nutrient Management Planning Technical Guidance

Kentucky Agricultural Statistics, 1999-2000

Integrated Animal Waste Management, Council for Agricultural Science and Technology, Task Force Report, No. 128, November 1996

Confined Animal Production and Manure Nutrients, USDA, ERS, Agriculture Information Bulletin No. 771, June 2001

USDA-EPA, March 1999, Unified National Strategy for Animal Feeding Operations,

CAFOs as Neighbors: An Analysis of Kentucky Nuisance Law and Agricultural Operations

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In July 1881, Joseph Hays and four of his neighbors in Louisville, Kentucky, filed a legal action against Frank Seifried, owner of a slaughterhouse, alleging that Seifried threw the intestines and other parts of slaughtered animals into tanks and boxes on his premises and that "the putrid and decayed flesh produced a foul and nauseous stench, such as poisoned the atmosphere for many feet in every direction . . . embracing [their] dwellings." The odor was so foul that it caused the neighbors to close the doors and windows of their dwellings during the evenings that spring of 1881. Even the doors and windows of a nearby church had to be closed. The stench was so horrific that it produced nausea in the residents and rendered their homes almost uninhabitable. Hays and his neighbors brought a nuisance action against Seifried, seeking to restrain him from using his slaughterhouse improperly. The court found that the odor was caused by Seifried's boiling of the skins and bones of dead animals without using the proper disinfectants. The court did not order Seifried to cease his business, but it did order him to cease operating it in a manner that used the slaughtered animals or parts of them to create the offensive and poisonous odor.

One hundred and twenty years later, residents of several counties in Kentucky raised the same complaints about foul odors emanating from neighboring agricultural operations. A resident of Hopkins County complained: "The odor from factory hog and chicken operations is nauseating and at times makes one's throat burn for days. People don't even want to be outside. Children waiting for the school bus have become sick on mornings when the air is still." Another resident stated that she and the residents of her county were very concerned about the chicken manure that is spread on the farms: "Not only is the stench bad, but the citizens living near these farms can't go out of doors after the chicken manure is spread." Others living near these poultry operations raised similar grievances: "Eight chicken houses were constructed in front of my house. Trees were bulldozed down and set afire. The smoke affected my husband, who suffers from emphysema. Manure is hauled out on weekends, preventing me and my children and grandchildren from being able to enjoy the outdoors on our property."

These residents are complaining about the impact of the operations of their newest neighbors - concentrated animal feeding operations (CAFOs). The number of CAFOs in Kentucky, currently estimated at 250, has increased over the past few years due to the increased siting of poultry houses, particularly in the western area of the state. As a result, broiler production in Kentucky has increased from 1.5 million in 1990 to 188 million in 1999. With increased broiler production, naturally comes an increase in waste and the problems of odor, vermin, and air and water pollution associated with that waste.

State and local officials have sought to regulate CAFOs and the problems associated with them through existing or new statutory schemes. For example, Marion, in Crittenden County Kentucky, enacted an ordinance that made it a nuisance to keep hogs within the city limits at any time from April 1 through September 30. The Kentucky Natural Resources and Environmental Protection Cabinet issued emergency CAFO regulations providing siting standards for the construction of new CAFO facilities. However, in order for local residents to recover their personal losses to property and health, they must decide to take matters into their own hands and seek redress through the courts. The common law of nuisance is one legal theory under which claims can be brought. This paper will examine Kentucky nuisance law and its application to CAFOs, particularly poultry agricultural operations. It also discusses the impact of Kentucky's right-to-farm law on a nuisance legal action.

Defining Nuisance

Nuisance law operates on the general principle that persons may use their property as they desire, provided that they use it in such a manner as not to injure others. Its legal meaning, however, is far less clear. Nuisance law has been labeled an "impenetrable jungle," a legal concept incapable of

exact definition. Perhaps the easiest understood (and most quoted) definition of nuisance was given by a justice of the United States Supreme Court in 1921 who wrote: "A nuisance may be a right thing in the wrong place, like a pig in the parlor instead of the barnyard." Interpreted this way, an otherwise lawful business or industry may not be a nuisance in and of itself, but may become a nuisance because of its particular location or because of its method of operation at that location.

Nuisance law has two branches - public nuisance and private nuisance. A public nuisance is an unreasonable interference with a right common to the general public and is generally brought by the state on behalf of its citizens. Landowners claiming harm to their land from the operations or activities on neighboring land would bring an action under private nuisance which is based upon an invasion of the individual's property or upon a disturbance of rights in land.

a. Public Nuisance

If an activity involves a significant interference with the safety or health of the general public or works some substantial annoyance or inconvenience to the public, it may be a public nuisance. The entire community need not be affected by the activity as long as the nuisance interferes with those who come in contact with it while exercising a public right. An activity which impacts the morals of a community may also be considered a public nuisance as well as an activity proscribed by statute or ordinance.

A public nuisance action is usually brought by the Commonwealth on behalf of its citizens. However, a private citizen may bring such an action if that citizen can show that he suffered peculiar injury apart from the injuries the general public suffered from the nuisance. Pecuniary loss to the complainant may be the type of injury which is different in kind to allow a private citizen to proceed under a public nuisance claim, unless such loss is common to the whole community.

b. Private Nuisance

Private nuisance law has developed into a balancing of the rights of neighboring landowners. One neighbor is asserting the right to use land for a lawful activity. The other is asserting the right to the undisturbed enjoyment of that land, seeking some reasonable comfort and convenience which is occupying it. For years, courts have struggled to balance these competing rights.

Kentucky courts have balanced two broad factors upon which to base the existence of a nuisance: 1) the reasonableness of the defendant's use of the property, and 2) the gravity of the harmful effect of the defendant's activity on the complainant. Applying this two-prong test requires a further balancing of several considerations, but in the long run boils down to a question of degree. The two factors of reasonableness and gravity are considered in light of the following circumstances:

- the lawful nature and location of the defendant's business;
- the manner of the operation of the defendant's business;
- the importance to the community of the defendant's business;
- the kind, volume, time, and duration of the particular annoyance;
- the respective situations of the parties; and
- the character, including applicable zoning, of the locality.

Despite the two branches of nuisance law and their differing requirements, the courts are not always clear about mak-

ing a distinction between the concept of a private nuisance and a public nuisance. Obviously, an activity can have an impact on the well-being of the general public and on the landowner's right to use and enjoy his own property. One Kentucky court noted that a plaintiff does not lose his right as a landowner simply because other landowners suffer the same kind of damage; the plaintiff may proceed upon either a public or private nuisance action, or both.

c. Damages and Injunctions

Under traditional nuisance law, a landowner can be ordered by the court to cease operations if these actions created a nuisance which caused substantial damages. Injunctive relief does provide a difficult question since shutting down an operation can negatively impact a community, its employment base, and its economy. In Bartman v. Shobe, the court pointed out that the interests of the parties and the public must be balanced in granting or withholding the equitable remedy of injunction; that the interest of the community and the public at large must be thrown into the scale.

One court which allowed an injunction, balanced the nature and importance of the nuisance-causing activity, in that instance a municipal sewage plant, against the harm to the complaining neighbors. That court allowed the injunction because the degree of the harm to the plaintiff was patently unreasonable, the cause of the harm was not a necessary or expected condition of the operation, and was remedial at relatively insignificant cost. The court also noted that the defendant in that case had been afforded adequate opportunity to remedy the harm.

Often the injunction does not completely shut down the operations, but orders the owner to operate in a manner that does not interfere with the rights of others to use and enjoy their property. In C. Rice Packaging Co. v. Ballinger, for example, a slaughterhouse and packing plant operating in Covington, Kentucky, in 1949 was merely enjoined from operating its plant in a manner which caused offensive odors and noises to emanate from it. In other words, the court did not shut the plant down.

Kentucky law does not allow for compensation for annoyance, discomfort, sickness, or emotional distress in a private nuisance action. Compensation may only be considered in determining the diminution in value or use of the land to the plaintiff. The law does allow a claimant to recover punitive damages for a private nuisance if the defendant acts with oppression, fraud, or malice.

By statute, Kentucky law allows particular damages for private nuisance action, reflecting the principle that nuisance actions protect property rights. For a permanent nuisance, damages are measured by the reduction in the fair market value of the claimant's property caused by the nuisance, not exceeding the fair market value of the property. For a temporary nuisance, compensatory damages are measured by how much the value of the property is reduced by the presence of the nuisance if the claimant occupied the property during the continuance of the nuisance. If the claimant did not, compensatory damages shall be measured by the diminution in the fair rental value of the property.

The nature of the nuisance determines whether it is a temporary or a permanent nuisance. A temporary nuisance is a continuing one which results from an improper installation or method of operation and can be remedied at a reasonable expense. For a temporary nuisance, a nuisance suit may be brought for each recurring injury. Odors, rats, and flies are considered temporary nuisances. Per-

manent structures may create either temporary nuisances or permanent nuisances. A permanent structure properly constructed and operated may be a permanent nuisance. For a permanent structure, whatever damages result from its construction must be treated in it's entirety.

Applying Nuisance Law to Poultry Operations

A 1966 case, Valley Poultry Farms, Inc. v. Preece, concerning chicken houses in Boyd County is instructive in demonstrating how a court might apply private nuisance law and its balancing nature to agricultural operations. In that case, the location of the agricultural operation was probably the most important factor in the court's deliberations. Valley Poultry Farms constructed four chicken houses in a rural part of the county. The chicken houses were located about 300 feet from the main residence of one of the complaining neighbors and about 150 feet from a rental house. The prevailing wind was from the chicken house toward the residences.The neighbors complained of noise, dust, odor, and insects. The noise, which began at 4:00 am, woke the neighbors from their sleep. The odors were so bad that windows had to be kept closed and meals were unfit to eat. The chicken manure attracted so many flies that clothes could not be hung out to dry without being "flecked" with flies.

The chicken houses owned by Valley Poultry Farms were found by the court to be a permanent nuisance even though the farm operated its chicken houses with due care. The court first noted that although the business was itself lawful and an otherwise reasonable use of land, it could be rendered unreasonable by the gravity of its harm upon the use and enjoyment of the land by neighboring landowners.

In the case, the Kentucky Farm Bureau Federation filed an *amicus curiae* (friend of the court) brief on behalf of Valley Farm stressing the importance of the poultry industry to Kentucky. The Federation contended that to rule against the farm would be tantamount to declaring all chicken houses nuisances, i.e., that chicken houses per se are inherently nuisances, and thus could not be operated in Kentucky. The Court of Appeals noted that the trial court had instructed the jury to consider the lawful nature of the chicken industry, the importance of its business, and its influence on the growth and prosperity of the commonwealth. However, the court affirmed the lower court's judgment that the location of the chicken houses, along with the noise, dust, odors, and insects, constituted a private nuisance to the neighbors because they were in such close proximity to them.

The Valley Farms case was decided before the introduction of full-scale CAFOs. The conclusion could easily follow that if the operations of chicken houses were nuisances in1966, the operations of even larger CAFOs are nuisances in 2001. A recent Tennessee case applied the common law nuisance analysis to CAFOs and like the Kentucky court in 1966, found these operations to be a nuisance. In the Tennessee case, the Cissoms sued their neighbors, the Millers, who had constructed five small chicken houses which held approximately 45,000 chickens and five larger ones which held approximately 122,000 chickens. The five large chicken houses emitted foul odors and caused a visible cloud of contaminated gas, containing feathers, dust, and chicken droppings. The houses also changed the contour of the Millers' property from a natural drainage pattern to a pattern resulting in increased rainwater runoff. The five larger chicken houses were constructed on the Millers' land after the Cissoms acquired their property.

The Court of Appeals of Tennessee affirmed a lower court's ruling that the odor from the new chicken houses was a temporary nuisance. There was overwhelming proof from a number of witnesses about the odor from the new chicken houses, which were much closer to the house owned by the Cissoms than the three smaller chicken houses. Miller himself testified that there was an odor for approximately one and one-half weeks on an every eight-week cycle when the chickens were being loaded for market. Thus, "foul, unhealthy, and offensive" odors can cause the poultry operations to become nuisances because of the proximity of their location to their neighbors' residences.

In Cissom v. Miller, an action against the Millers for the operation of the chicken houses located on their lands prior to the acquisition of the property by the Cissoms was barred by a Tennessee statute intended to protect agricultural operations from nuisance actions by encroaching development. The particular law at issue is the right-to-farm act.

Right-To-Farm Laws and Nuisance Law

Because of increasing concern with the loss of agricultural lands to non-agricultural uses, especially encroaching residential subdivisions, state legislatures have attempted to slow the loss by enacting right-to-farm laws, such as the one at issue in the Cissom case. Although the exact language of the various state laws may differ, the basic goal of these statutes is to protect farmers and farm operations from nuisance liability.

Many of these statutes prevent the conversion of farmland to non-agricultural uses by codifying the "coming to the nui-

sance" defense. This common law defense, if permitted absolutely, bars recovery of damages by a complaining neighbor who moved into an area where a particular industry or agricultural operation was previously located. Without the defense, an operation that was well-suited to its location becomes a nuisance when it interferes with the rights of landowners who later acquire property near that location. Other jurisdictions do not consider "coming to the nuisance" as an absolute barrier to recovery of damages, but as an important factor to be balanced along with all the other considerations for determining whether a particular activity is a nuisance.

Kentucky originally enacted a right-to-farm law in 1980 that governed nuisance actions and the ability of local governments to abate agricultural nuisances. The policy behind the statute was to conserve, protect, and encourage the development and improvement of agricultural lands in Kentucky for the production of food and timber:

> When nonagricultural land uses extend into agricultural and silvicultural areas, agricultural and silvicultural operations often become the subject of nuisance suits or legal actions restricting agricultural or silvicultural operations. As a result, agricultural and silvicultural operations are sometimes either curtailed or forced to cease operations.

In effect, the statute prohibits agricultural operations from becoming a public or private nuisance because of changed conditions in the area if the agricultural operation has been in operation for more than one year and the operation was not a nuisance at the time it began operating. "Agricultural operation" is defined in the statute to include any facility that is used for the production of poultry, poultry products, and livestock products and is performed in a reasonable and prudent manner customary among farm operators.

The question of whether this definition applies to CAFOs arose in an Opinion of the Attorney General of the Commonwealth that addressed the issue of whether the statute prohibits counties from regulating industrial-scale hog operations. The August 21, 1997, opinion critiques the language of the statute, calling it "inarticulate." The opinion concluded by rendering the decision that local governments are not precluded from regulating industrial-scale operations. The opinion goes on to describe industrial-scale hog operations:

> Called by various names - industrial hog farm, mega-farm, industrial-scale farm - the operation we will describe hardly deserves to be called a farm at all. An industrial-scale hog operation is less a farm than a manufacturing facility. Gone is the bucolic image of the lowing herd winding slowly o'er the lea. Gone is the symbiosis between farmer and land. For the most part, condition of the land is immaterial on an industrial-scale hog operation; the operation could be carried out effectively on a shingle of solid rock.

With that description, it is not surprising that the opinion concludes that the practice of industrial-scale hog farming is neither reasonable nor prudent. Furthermore, these large scale operations are not considered acceptable or customary. Thus, these large-scale hog operations are not the agricultural resources intended to be protected under the statute; they are instead industrial operations.

The Attorney General's opinion did not address the issue of the application of the statute to private nuisance actions. However, the argument could be made that if CAFOs are not protected "agricultural resources" when counties seek to regulate them by zoning or other means, then they are likewise not protected "agricultural resources" when neighboring landowners seek redress under claims of common law nuisance. The same analysis would apply.

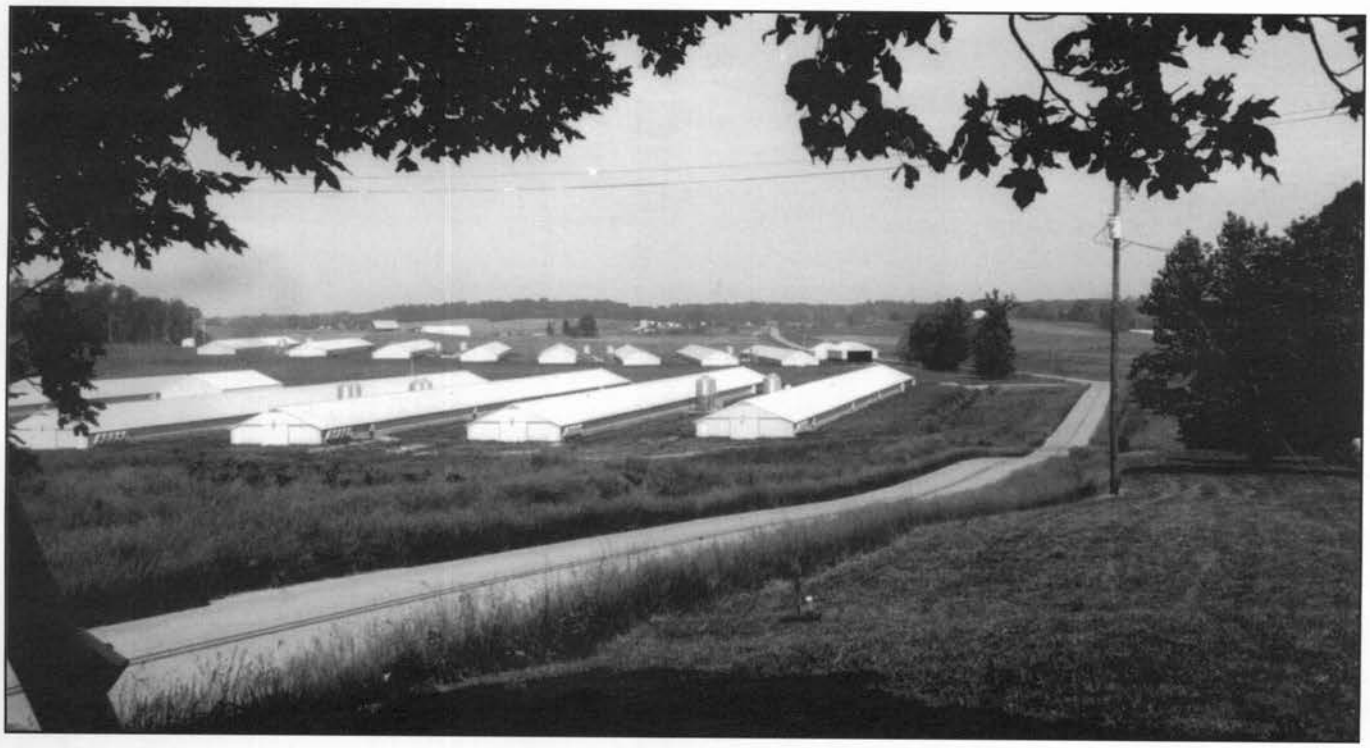
A recent Pennsylvania case indicates that courts are barring actions for private nuisance claims against poultry operations under right-to-farm acts. In Horne v. Halady, a poultry business owned by Halady began operating in 1993 when

it stocked its poultry house with 122,000 laying hens. In 1994, the owner constructed a decomposition building for waste, which included dead chickens. The next year, Horne filed a claim against Halady Farms claiming that the operation of the poultry houses interfered with the use and enjoyment of his property. Horne complained of flies, odor, and noise and also claimed that waste, including eggshells, feathers, and dead chickens, were found on his property. He alleged harm, because of the substantial depreciation in the value of his home, in the amount of $60,000.

The court held that the nuisance claim was barred by the provisions of the state's right-to- farm act. The court explains that the act does not absolutely prohibit those persons negatively affected by agricultural operations from filing nuisance suits against their agricultural neighbors. Instead, the act requires that the nuisance actions must be filed within one year of the inception of the agricultural operation or if there is a substantial change in that operation during that period. In this particular case, the poultry houses began operation in 1993. The only change in the operation was the construction of a decomposition house in August 1994. Because Horne did not institute his suit until November 1995, more than one year after the change in the operation, his action was time-barred.

The court found that the poultry farm was a "normal agricultural operation" under the Pennsylvania law and that it was lawfully operated. The operation was located in an area zoned for agricultural purposes. The court in reviewing the record found no indication that any government official had ever cited Halady for failing to conduct business in a lawful manner. Instead, the record revealed a letter from an inspector of the Pennsylvania Department of Agriculture which found no merits to complaints about odor and flies. The inspector concluded after a visit that the Halady farm operated within normal and reasonable levels of odor and fly control and with a pro-active management approach.

Thus, the Pennsylvania court barred a nuisance action brought by landowners who acquired property in the area after the initial agricultural operation had begun. However, an existing neighboring landowner may not be barred from pursuing nuisance suits. Several courts have interpreted the right-to-farm statutes narrowly, "refusing to extend the nuisance protection to situations beyond those in which existing farms are threatened with nuisance suits by encroaching non-agricultural uses." In other words, the complaining existing neighbor asserted that he did not "come to the nuisance," but rather the "nuisance came to him" when the nature of the activity changed from traditional farming to a full-scale industrial operation. A North Carolina court found that argument persuasive when it held that the state's right-to-farm act did not cover situations in which a party fundamentally changes the nature of the agricultural activity which had been covered by the statute. The fundamental change that occurred in that case resulted when a landowner who previously operated turkey houses changed his farming operation to that of a hog production facility.



Conclusion

Landowners suffering from the odor, noise, flies, and pollution from neighboring CAFOs may hope to find relief in the courts for the harm caused to their property. However, seeking redress through litigating under the common law doctrine of nuisance is not without risks and uncertainties. First, litigation generally is time-consuming and costly. A resolution of the problem is rarely immediately forthcoming. Second, depending upon a court's interpretation of the state's right-to-farm act, the nuisance claim may be barred by the time limitations of the statute. Third, even if the action goes forth, compensatory damages for private nuisances are limited to existing property values. An injunction, which a court may issue particularly if the operation is found to be a public nuisance, may be difficult to enforce. Last, neighbors may be reluctant to sue neighbors in small, tight-knit communities. In struggling rural Kentucky communities, operating CAFOs may be viewed as an acceptable alternative to growing tobacco. An individual who challenges CAFOs might be reguarded as threatening the economic welfare of the area.

Nuisance law seeks to balance the competing rights of neighboring landowners. The owners of CAFOs may assert a right to use their lands for agricultural purposes, but under a nuisance analysis, that right will be weighed against the right of the neighboring landowners to enjoy the comfort and convenience of their property. A Kentucky justice must have foreseen the tension between these neighboring land uses when he wrote in 1963:

> **There was a time when a man's right to the unmolested enjoyment of his property was nearly absolute, but the industrial revolution changed all this, and there came a time when industry could do no wrong so long as its activities were lawful and it committed no direct trespass. Today the policy of the law is to achieve a reasonable balance between the peace and dignity of the individual, especially in the enjoyment of his home and community, and the needs of commerce.**

Hogging It: Estimates of Antimicrobial Abuse in Livestock

This is the executive summary from the UCS report "Hogging It: Estimates of Antimicrobial Abuse in Livestock"

By
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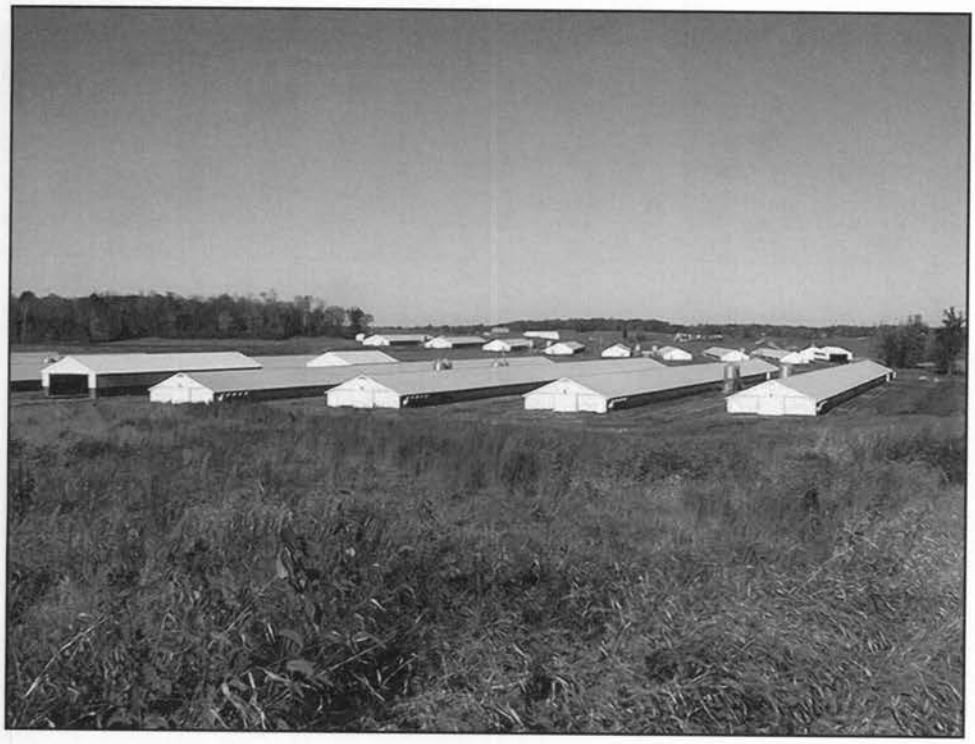

Antimicrobial resistance is a public health problem of growing urgency. Although use of antimicrobials in humans is the largest contributor to the problem, use of antimicrobials in agriculture also plays a significant role. Mounting evidence is confirming the view, long held in the public health community, that antimicrobial use in animals can substantially reduce the efficacy of the human antimicrobial arsenal.

Now is the time to act to curb the overuse of antimicrobials in animals. But as public health officials and citizens turn to this task, data on quantities of antimicrobials used are not publicly available, even though these data are critical to designing an effective response to the problem.

This report attempts to fill in that gaping chasm by providing the first transparent estimate of the quantities of antimicrobials used in agriculture. We have devised a methodology for calculating antimicrobial use in agriculture from publicly available information including total herd size, approved drug lists, and dosages. The method is complex but sound, and the results are startling. We estimate that every year livestock producers in the United States use 24.6 million pounds of antimicrobials for nontherapeutic purposes. These estimates are the first available to the public based on a clear methodology. We have been careful in making these estimates, always choosing conservative assumptions. We hope that any critics of this study who claim the estimates are incorrect will provide the documented data needed to refine them.

Conclusions

The results of our study indicate the following:

Tetracycline, penicillin, erythromycin, and other antimicrobials that are important in human use are used extensively in the absence of disease for nontherapeutic purposes in today's livestock production.

Cattle, swine, and poultry are routinely given antimicrobials throughout their lives. Many of the antimicrobials given to livestock are important in human medicine.

The overall quantity of antimicrobials used in agriculture is enormous.

Many consumers will be surprised to find that tens of millions of pounds of antimicrobials are used in livestock systems. We estimate that every year livestock producers in the United States use 24.6 million pounds of antimicrobials in the absence of disease for nontherapeutic purposes: approximately 10.3 million pounds in hogs, 10.5 million pounds in poultry, and 3.7 million pounds in cattle. The tonnage would be even higher if antimicrobials used therapeutically for ani-

Estimated Nontherapeutic Antimicrobial Use In Livestock Production

Beef Production

Antimicrobial	% of Feedlot Cattle (700-1200 lbs) Treated	Duration of Use	Total Antimicrobial All Treated Animals (mg)	Antimicrobial Use in Treatment of Human Disease*	Primary Use of Drug in Treatment of Human Disease
Oxytetracycline	30	Feed continuously	45,523,760,625	II	antibiotic, antimicrobial
Monensin	55	Feed continuously	381,532,470,000	III	none
Chlortetracycline	46	28 days	65,149,559,650	II	intestinal and systemic protozoa
Tylosin	43	Feed continuously	119,315,608,800	III	none
Bacitracin	4	Feed continuously	9,711,735,600	II	skin and eye infections
Chlortetracycline/ Sulfamethazine	5	48-hour withdrawal	28,325,895,500	II	chlamydia
Erythromycin thiocyanate	5	Feed continuously	5,202,715,500	II	broad spectrum antibiotic
Iasalocid	40	Feed continuously	277,478,160,000	III	none
			932,239,905,675		

***Classes of antimicrobial drugs used in the treatment of human diseases:**

I. Used to treat human diseases, few or no alternatives
II. Used to treat human diseases, alternatives exist
III. Not currently used to treat human disease

mals were included.

Previous estimates may be drastic underestimates of total animal use of antimicrobials.

A study recently released by the Animal Health Institute (AHI) may have severely underestimated animal use of antimicrobials. Our estimate of 24.6 million pounds for animal use is almost 50 percent higher than industry's figure of 17.8 million pounds — and ours includes only nontherapeutic usage in the three major livestock sectors. AHI's covers all uses — therapeutic and nontherapeutic — in all animals, not just cattle, swine, and poultry.

Approximately 13.5 million pounds of antimicrobials prohibited in the European Union are used in agriculture for nontherapeutic purposes every year by US livestock producers.

The European Union has prohibited nontherapeutic agricultural use of antimicrobials that are important in human medicine, such as penicillins, tetracyclines, and streptogramins. Total US agricultural use of these banned antimicrobials is enormous.

Driven primarily by increased use in poultry, overall use of antimicrobials for nontherapeutic purposes appears to have risen by about 50 percent since 1985.

According to our estimates, total nontherapeutic antimicrobial use in animals has increased from 16.1 million pounds in the mid-1980s to 24.6 million pounds today.

Estimated Nontherapeutic Antimicrobial Use In Livestock Production

Swine Pr oduction

Antimicrobial	% of Finishing Swine (100-260 lbs) Treated	Duration of Use	Total Antimicrobial All Treated Animals (mg)	Antimicrobial Use in Treatment of Human Disease*	Primary Use of Drug in Treatment of Human Disease
Oxytetracycline	30	Unknown	296,332,298	II	antibiotic, antimicrobial
Bacitracin	60	Feed continuously	740,830,746	II	skin and eye infections
Chlortetracycline	55	Unknown	950,732,791	II	intestinal and systemic protozoa
Tylosin	30	Feed continuously	148,166,149	III	none
Chlortetracycline Sufathiazole Penicillin	12	7-day withdrawal	740,830,746	II	broad spectrum antibotics
Tylosin sulfamethazine	5	Feed continuously	206,742,464	III	none
Erythromycin	5	Unknown	17,903,410	III	none
			3,101,538,604		

***Classes of antimicrobial drugs used in the treatment of human diseases:**

I. Used to treat human diseases, few or no alternatives
II. Used to treat human diseases, alternatives exist
III. Not currently used to treat human disease

In poultry, nontherapeutic use since the 1980s has increased by over 8 million pounds (from 2 million to 10.5 million pounds), a dramatic 307 percent increase on a per-bird basis. Growth in the size of the industry accounted for about two-fifths of the overall increase.

In swine, nontherapeutic use has declined slightly (from 10.9 to 10.3 million pounds), although there is growing reliance on tetracycline-based products.

The quantities of antimicrobials used in the absence of disease for nontherapeutic purposes in livestock dwarfs the amount of antimicrobials used in human medicine.

Our estimates of 24.6 million pounds in animal agriculture and 3 million pounds in human medicine suggests that 8 times more antimicrobials are used for nontherapeutic purposes in the three major livestock sectors than in human medicine. By contrast, industry's estimates suggest that two pounds of antimicrobials are used in treating human disease for every pound used in livestock.

Livestock use accounts for the lion's share of the total quantity of antimicrobials used in the United States. Our estimates suggest that nontherapeutic livestock use accounts for 70 percent of total antimicrobial use. When all agricultural uses are considered, the share could be as high as 84 percent. This estimate is far higher than the 40 percent figure commonly given in the literature for the agricultural share of antimicrobial use.

The availability of data on antimicrobial use in fruit and vegetable production demonstrates that credible usage information can be obtained without unduly burdening either agricultural producers or the pharmaceutical industry.

Estimated Nontherapeutic Antimicrobial Use In Livestock Production

Poultry Production

Antimicrobial Combination Number	% of Grower and Finishers Treated	Duration of Use	Total Antimicrobial All Treated Animals (mg)	Antimicrobial Use in Treatment of Human Disease*	Primary Use of Drug in Treatment of Human Disease
#1 Bambermycin, lasalocid, roxarsone	28	Feed continuously–5 day withdrawal	835,511,040	IIII	none
#2 Erythromycin, arsanilic acid, zoalene	10	No limitation– 5 day withdrawal	554,112,000	I	respiratory track infections, middle ear infections, and skin infections
#3 Chlortetracycline, roxarsone, monensin	5	Feed continuously–5 day withdrawal	613,454,400	II	intestinal and systemic protozoa
#4 Penicillin, roxarsone, zoalene	5	No limitation – 5 day withdrawal	195,530,400	II	respiratory track infections, middle ear infections, and skin infections
#5. Lincomycin, lasalocid, roxarsone	20	Feed continuously–5 day withdrawal	600,537,600	II	antibacterial agents
#6. Virginiamycin, monensin, roxarsone	28	Feed continuously–5 day withdrawal	774,184,320	I	Prevention of bacterial infections
			3,573,329,760		

***Classes of antimicrobial drugs used in the treatment of human diseases:**

I. Used to treat human diseases, few or no alternatives
II. Used to treat human diseases, alternatives exist
III. Not currently used to treat human disease

This report presents several years of data on the quantity of antimicrobials used as crop pesticides. These easily accessible data were compiled by the US Department of Agriculture, which uses producer surveys to gather information on pesticide use each year.

Recommendations

1.The Food and Drug Administration (FDA) should establish a system to compel companies that sell antimicrobials for use in food animals or that mix them in animal feed or water to provide an annual report on the quantity of antimicrobials sold. The information should be broken out by species and by antimicrobial. It should include the class of antimicrobial, indication, dosage, delivery system, and treatment period.

2.The US Department of Agriculture (USDA) should improve the completeness and accuracy of its periodic surveys of antimicrobial use in livestock production.

3.The FDA, USDA, and Centers for Disease Control and Prevention (CDC) should speed up implementation of Priority Action 5 of A Public Health Action Plan to Combat Antimicrobial Resistance, *the US government's recently published action plan on antimicrobial resistance, which calls for the establishment of a monitoring system and the assessment of ways to collect and protect the confidentiality of usage data.*

The Stink Over Concentrated Animal Feeding Operations

By
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Few issues affecting agriculture have been as controversial and divisive as that of concentrated animal feeding operations (CAFOs).[1] The displacement of traditional, low-intensity, livestock operations with industrial-scale facilities where farmers under contract with corporate "integrators" feed and house the corporate-owned animals for a fee under controlled and confined conditions, has profound economic, environmental, social and political consequences.

These intensive livestock operations are a component of a system of industrial production of pork and chicken products through an integrated structure of companies, investors and contractors. These operations reflect an industrialization of agriculture, where the processing and production operations are controlled by fewer and larger businesses that either purchase farms to produce the products they need (called vertical integration) or make contracts with farmers to produce these products. Under the contract model, farm-level control over agricultural production decisions is replaced by corporate control through the contracts, relegating farm-level workers to the role of hired labor.[2]

A modern industrial-type swine operation includes one or more hog houses holding potentially hundreds or thousands of animals, an automated feeding system, slatted metal floors which serve as a feces and urine collection system, an anaerobic lagoon, and fields for land disposal of partially decomposed wastes. Hogs produce a large amount of waste per animal, various estimates give figures of 2 to 10 times as much as a human per day.[3] The waste products of such facilities, although posing environmental and health concerns not dissimilar from human waste, are managed in a less rigorous fashion that creates a significant risk of on and off-site environmental contamination.

Intensive poultry operations, where chickens are raised in confined conditions, produce a waste litter that absorbs much of the liquid waste, but the operations generate significant waste material, odor, flies and associated air and water pollution problems otherwise similar to those of intensive hog operations.

The intensity of local opposition to concentrated poultry and hog feeding operations in Kentucky and catastrophic lagoon failures in eastern North Carolina, prompted action by the Patton Administration to impose a moratorium on permitting of industrial swine operations. By Executive Order on July 25, 1997, Governor Paul Patton directed the Natural Resources and Environmental Protection Cabinet to develop regulations sufficient to assure that livestock operations are conducted "in a safe and environmentally sound manner to ensure a safe, healthy and beautiful environment and the continued and renewed ability of the Commonwealth's farmers to maximize production on their farms now and in the future." The intervening 41 months since the issuance of that Executive Order have seen a tug-of-war between industrial livestock operation advocates and those favoring more rigorous regulation of such facilities and a model of lower intensity livestock production. It is a battle for survival of independent small farms v. agribusiness, being waged in part on the battleground of the environmental and community impacts, with executive and legislative policymakers at an impasse on whether to subsidize industrial agriculture by maintaining lax environmental requirements, or to require industrial agricultural operations to fully

account for and mitigate environmental and community impacts, thus creating a less "hospitable" economic climate for such facilities.

In September 1997, the Kentucky Natural Resources and Environmental Protection Cabinet published emergency regulations addressing certain aspects of concentrated animal feeding operations. From that time until the present, there has been a frustrating cycle of efforts by the Cabinet to adopt regulations establishing setbacks between such operations and natural resources and to require the corporate integrators to share in the liability for environmental compliance from such operations; among them rejection of regulations by legislative oversight committees, expiration of the regulations at the end of the following legislative session; unsuccessful efforts by industrial agriculture proponents to enact legislation foreclosing the Cabinet's regulations, and a new set of regulations after the end of the legislative session.[4]

The two issues in contention in the regulations are the use of "setbacks" in order to avoid environmental impacts from the feedlot and waste disposal areas of the concentrated animal feeding operations, and whether the corporate "integrators" who own the livestock, supply the feed and any additives, and exert substantial control over the conditions of the livestock production, and who reap the lion's share of profits, should be required to bear commensurate risk by being jointly liable for environmental contamination or releases from the facility.

The potential for concentrated animal feeding operations to adversely affect the environment, including the quality of life of neighbors in rural areas, is well documented. The environmental problems associated with intensive poultry and hog operations arise because too many animals are confined in one place, creating a significant waste and wastewater volume containing high levels of nitrogen, phosphorus, and other constituents such as certain metals that must be managed and disposed of. Rather, the debate centers on whether Kentucky should lead or follow in the area of extending regulation to the environmental and human consequences of these facilities, or to await federal leadership.

The old adage "Your freedom ends where my nose begins" was never more appropriate than when addressing industrial-scale livestock waste management. The concentration of significant outputs of nutrients in waste into a geographically compact area, and use of land areas for disposal of partially treated wastes, is a legitimate matter for government concern. Intensive hog and poultry production operations can be significant sources of air pollution; odors, surface and groundwater pollution, and can if improperly sited, constructed or operated, create a public nuisance. The debate over environmental and human health costs associated with these industrial-scale operations and the management of the wastes and wastewaters generated by these facilities focuses on whether these impacts will be **fully accounted for** by the facilities and those who control the production decisions, rather than being placed on the contract farmer or externalized through groundwater or surface water pollution, contamination of agricultural land, and loss of property values and of use and enjoyment of other properties due to airborne odors, pathogens and air toxic emissions.

Among the concerns associated with industrial-scale livestock production are these:

- odors and gases within confinement buildings and emissions from anaerobic lagoons and land application, which are major sources of ammonia and other noxious and toxic emissions, posing risks to workers and neighbors alike. The physical and emotional toll of odors associated with these operations on "downwinder" neighbors has likewise been documented;

- excessive or inappropriate land application of wastes and wastewaters can cause surface water pollution since up to half of the nitrogen applied is not used and is transported through leaching, evaporation or runoff, along with phosphorus, copper, zinc and other trace metals and compounds;

- disposal of carcasses and of manure (CAFO operations can attract significant fly populations, which can be vectors of several diseases in humans);

- surface waters may be affected by the atmospheric deposition of ammonia off-gassed from lagoons;

- excess nutrient (nitrogen, phosphorus, minerals and metals) loading into streams resulting in nuisance algal blooms, hypoxia (low oxygen levels) and anoxia (complete loss of oxygen), causing fish kills. Excessive application of manure results in leaching of nitrates through soil into groundwater. The costs of improper management of animal wastes on fisheries and natural resources are potentially significant;

- animal wastes are a significant health concern because they contain a vast array of pathogens. The need to carefully control the management of swine wastes because of the possibility of transmittal of flu viruses and other diseases from swine to humans and from poultry via swine to humans;

- nitrate contamination of surface and groundwater supplies is a significant public health concern.

Against this backdrop, the Cabinet has been unsuccessful in adopting a durable set of regulations providing even a modicum of controls. The Cabinet has chosen to use two tools – first, it has employed the use of setbacks as a tool for minimizing air and land transport of water pollutants from waste management and landspreading areas. Setbacks, creating a spatial buffer between the activity and sensitive human or ecological receptors, is a commonly-employed tool in managing the odors, airborne toxics, disease-causing organisms and other air contaminants associated with these facilities. In establishing appropriate setback distances, varying distances have been used by states and localities.[5]

The second controversial tool that the Cabinet has employed is to impose on the contracting corporations joint liability for environmental compliance with permit conditions. The inclusion of integrator liability rests on the principle that primary or joint responsibility for compliance with water discharge (KPDES) permit conditions rests with the owner of the animal generating the waste, and the one who is directing the manner in which the animal is raised and managed.

The imposition of responsibility for environmental compliance on the party contracting with the local producer is not without precedent, and is particularly appropriate in this case since the input and output decisions are largely dictated by the corporations and their integrators. The question is whether responsibility for environmental compliance should be shared by the corporation and integrators, or borne entirely by the contract farmer or other third party. The imposition of joint liability is fully consistent with the proposed EPA strategy for addressing confined livestock operations, and consistent with EPA's recognition that "operator" is a term that is interpreted to include the corporate integrators, in order to assure that the responsibility and accountability is placed on those who own the animals and who have the ability to direct the operations of the facility.

The regulations are far from a comprehensive effort to manage the environmental impacts of CAFOs. Stymied by the legislative policy that creates a regulatory "ceiling" of federal "floor" pollution control standards, a more comprehensive regulatory framework awaits state legislative action or finalization of regulations and regulatory policy by the U.S. Environmental Protection Agency and U.S. Department of Agriculture.[6] Such an effort would include a comprehensive nutrient management plan addressing pollution runoff potential from all site activities, (including litter storage and landspreading, storage of feed and mineral or chemical additives and inputs; disposal of wastewater associated with the cleaning or disinfection of the facility); siting provisions; standards for construction and design of facilities; protection against catastrophic failure, leakage, odor from lagoons; liner and seepage standards for lagoons; characterization of wastes and wastewaters for all potential pollutants including disinfectants, pesticides, antibiotics, hormones, heavy metals in feeds, bacteria, and viruses; standards for control of odors, air pollution, potential for spread of disease, and water pollution associated with use of anaerobic lagoons and land application for waste and wastewater treatment; evaluation of the feasibility of alternative waste and wastewater treatment systems; controls on run-on and runoff from all waste storage and disposal areas; controls on land application, a comprehensive nutrient management plan demonstrating that the waste and wastewater will be managed so as to prevent nuisance and pollution; characterization of the waste, wastewaters and manure; controls on land application of wastes and wastewaters, including controls on application rates to assure that any land application will not exceed soil and plant uptake, and measures to address the problem of long-term concentration of salts and metals in soil, and movement of those salts and metals into the groundwater; litter and waste storage controls; prohibitions on aerial spraying of wastewater and requirements for immediate incorporation and injection; plans for management and disposal of dry chicken "litter" from broiler houses and layer cages and "wet litter"; and characterization of the geological setting proposed for land application of wastes from such operations. Such a program would also include consideration of the past compliance history of all owners and controllers of the applicant and a prohibition against issuance of new permits to any facility which has an outstanding unresolved violation of any air, land or water pollution law; financial assurance that some funds will be set aside to assure proper closure of the facility and clean-up of any spill or release is needed; liability insurance to pay any judgments or claims from third-parties; appropriate reporting obligations; a ban on anaerobic lagoons and landfarming wastes or wastewaters for intensive hog production operations; public participation; and use of Best Available Waste Management Technology for new or expanded large-scale operations.

The siting and operation of these concentrated animal feeding operations has been the subject of intense regulatory activity and legislative debate, pitting large corporations, the Farm Bureau, and livestock associations against small farmers, rural neighbors, urban and rural conservationists, and the cities and towns that are faced with the nuisance caused by concentration and landspreading of substantial volumes of minimally-treated wastes. Whether concentrated animal feedling operations will be required to fully account for and mitigate environmental impacts, will in turn affect the economic viability and environmental "sustainability" of this

method of production. Whether the deep pocket corporations who have, through contracts of adhesion, shifted the liability and economic risk downwards in the integration model onto the contract farmers while maximizing control and profits up the chain, will be required to stand accountable in the environmental area for the compliance of those operations, will likewise determine whether the state is viewed as an environment accommodating to this model of production of livestock.

The environmental issues concerning concentrated animal feeding operations are a facet of the larger struggle to define the future face of agriculture in our state and nation - a struggle for survival of independent farms against the vertically integrated contract farming model. The issues concerning the trend of increasing concentration of agricultural and livestock ownership, control and market power in the hands of a few corporations, and the economic and social effects of introduction of contract livestock production on communities and local markets must be understood and assessed in order to shed light on the dramatic consequences of the policy choices that this Commonwealth will make in the next few years.

There is strong evidence that vertically integrated and contract-based livestock production operations have negative, rather than positive, economic effects on state and local economies, with attendant negative social and health consequences for communities. For those farmers who attempt to maintain independence, the advent of corporate livestock production is a significant threat. As the percentage of livestock production under contract to the corporate integrators increases, market availability and the sale price for the independents drops precipitously. Measured in local economic impact, vertically-integrated contract operations produce less permanent jobs, less local retail spending, and less local per-capita income, than independent farm operations. For every job created, factory farms displace many more jobs both on and off the farm.[7] Vertical integration means often that local suppliers of fuel, feed and farm supplies are shut out of the market and that the profits are shifted out of state.[8]

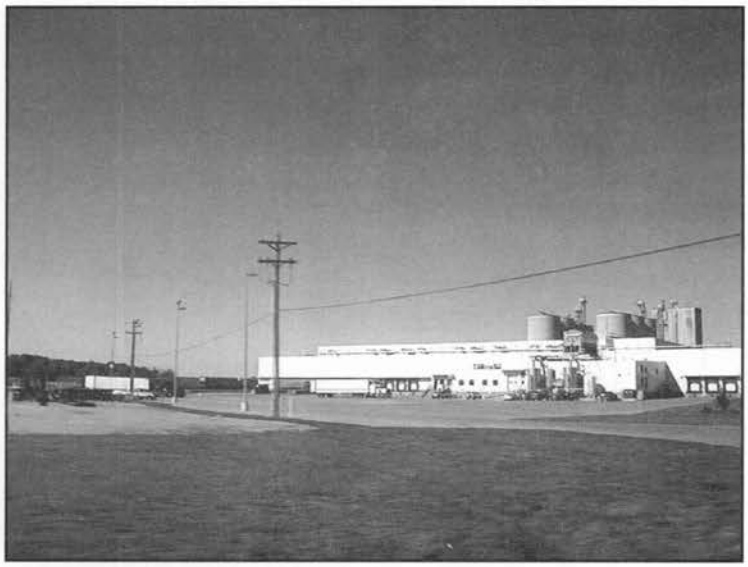
Overall "a change towards corporate agriculture produces social consequences that reduce the quality of life for rural communities." According to a 1990 Study by sociologist Linda Labao, summarizing forty years of empirical research, "an agricultural structure that was increasingly corporate and non-family owned" tended to lead to population decline, lower incomes, fewer community services, less participation in the democratic process, less retail trade, environmental pollution, more unemployment and an emerging rigid class structure.

Kentucky is in a somewhat unique position relative to other agricultural states. Kentucky has the highest number of family farms, many of which have been at least in part reliant on tobacco allotments for financial stability. The dramatic changes in the tobacco program which are anticipated in the near future, as well as structural changes in the agricultural economy, make this a particularly unsettling and vulnerable time for Kentucky's farmers. In such a time, the potential for victimization by a system of integrated contract livestock and poultry production is heightened.[9]

The environmental issues concerning concentrated animal feeding operations have also become a significant field of battle between the branches of state government over the implementation of regulatory policy. A legal challenge to the emergency regulation adopted after the 2000 General Assembly session resulted in a determination that under KRS Chapter 13A, the new regulation was "substantially similar" to the former, rejected regulation and thus could not be lawfully promulgated.[10] That decision is in abeyance pending resolution of a declaratory judgment action filed by the Gov-

ernor,[11] spawned in no small part because of this policy impasse, asking the Court to declare that the legislative oversight committees lack the power to determine a regulation invalid and to cause it to expire at the end of the next legislative session unless enacted into law.

The resolution of that case could affect more than merely the survival of this regulation. Propelled by the myth that economic development suffers from rigorous environmental regulation and high environmental standards, the legislature through the oversight committees have caused the expiration of numerous environmental regulations deemed to be "more stringent" than the bare minimum required by federal law. The legislative review process by which the Administrative Regulation Review Subcommittee and the substantive committee of jurisdiction review administrative regulations, has never resulted in the strengthening of a regulation proposed by the Governor, but instead has been a "no man's land" in which any effort to extend protection of the laws to air, land and water resources more rigorous than mandated by federal law to states choosing to manage the federal environmental programs, is determined "deficient" and placed in jeopardy of expiration. The delegation of the power to determine law to a relative handful of legislators and the heavy-handed manner in which that review authority has been wielded in the environmental arena has affected not only the survival of the regulations, but has created a climate in which the agencies are loathe to attempt to propose a regulation more appropriate and comprehensive in approach. The result is the rejection of a modest regulation that, by any fair yardstick, is far short of the goal of the Executive Order.



The fundamental policy question that has to be asked is whether the state will follow a policy of allowing, even sanctioning, the development of a corporate model of vertically integrated or contract-based industrial agriculture, in which the prices at the farm gate are kept low, the risks are disproportionately shifted to the backs of the farmers, and the farmers are required to have the best technology and to bear the risks associated with retiring the debt on such technology; or whether the state will help to foster locally-owned value added opportunities and help to create processing cooperatives that will enable farmers to obtain higher prices and to successfully compete with similar corporate-owned facilities for market share. Agriculture in Kentucky is at a crossroads, in which we can choose a path of replacing an uncomfortable dependency on tobacco production with an equally uncomfortable dependency on contract livestock production, or where we can cultivate and grow an agricultural economy which is locally owned and operated, capable of competing in the marketplace, and sustained by independent farmers cooperating in development of value-added agriculture.

As the state debates agricultural policy in the 2002 legislative session and allocates tobacco settlement money, the legislature has a fundamental policy choice that it must promptly face, lest inaction lead to *de facto* adoption of a policy that favors through inadequate economic policy and through inadequate environmental regulation, the displacement of local farm economies with vertically-integrated industrial-scale corporate farming. The question of industrial agriculture is not merely one of significant environmental problems associated with the intensity and density of such operations. It is, in fact, a question of whether we will seek to encourage, cultivate and sustain "a Kentucky where family farms, natural beauty and strong communities are enduring legacies to our children."[12][13] Agricultural economist John Ikerd, describing the industrial model of livestock production as tomorrow's problem disguised as today's solution, concluded with this observation:

> The primary advantages for rural areas in the twenty-first century will be the unique qualities of life associated with open spaces, clean air, clean water, scenic landscapes, and communities of energetic, thinking, caring people. Communities that sacrifice these long run advantages for short run economic gains may have a difficult time surviving in the new century. Thus, my number one concern is that large-scale, corporate hog operations are tomorrow's problem disguised as today's solution. They may keep rural people from doing the things

that need to be done today to ensure the future of their communities. Large-scale, corporate hog operations will not create communities where our children and their children will choose to live and grow. Communities with a future must take positive actions today to ensure a desirable quality of life for themselves, their children, and rural children of future generations.

References

[1] The determination of whether a livestock operation constitutes a "concentrated animal feeding operation" depends on the number of livestock housed, the conditions under which the animals are confined, the type of waste management system, and the environmental impacts.

[2] One contract grower likened the relationship of integrator to contract farmer to a feudal relationship. "You are like a serf on your own land," said Mary Clouse, a North Carolina grower. The integrators, through the contract, control the quality of chickens (and health) delivered, the composition of the feed, the type of equipment to buy and when to use it. Southern Exposure, "Ruling the Roost." Summer 1989, Volume XVII, No. 2.

[3] Cahoon, *Hogs Threaten Disease As Well As Pollution,* (1995).

[4] The website for the Kentucky Division of Water on Concentrated Animal Feeding Operations, http://water.nr.state.ky.us/dow/cafo2.htm, contains an extensive chronology of the regulatory history of this issue, with links to court decisions, regulations, statements of consideration in response to public comments, and other supporting information. EPA maintains a website at http://www.epa.gov/ost/guide/cafo/index.html with access to supporting documentation concerning their strategy for addressing water-related impacts of concentrated animal feeding operations.

[5] According to an article in *Environmental Health Perspectives, (*December 1995), the National Pork Producer's Association recommended new hog operations be located 1,500 feet from houses and 2,500 feet from schools, hospitals and churches. The research conducted by Dr. Schiffman at Duke University indicated that swine odors tend to drift in a plume, and that the plume is not attenuated at significant distances, and is offensive at extremely low concentrations.

North Carolina's legislature, in 1996, proposed a 1,000- to 1,750-foot property line setback, depending on size of operation, 1/4 mile to any waterbody (minimum), up to 1/2 mile for significant waterbodies (down to 500 feet if lagoon is concrete lined); 500 foot to any well, 100 foot to any ditch or swale; which setbacks may be expanded depending on location relative to the 100-year floodplain, soil type, location in watershed, nutrient sensitivity of receiving waters, slope, proximity to other pollutant sources, and parklands. In Lincoln Township, Missouri, setbacks depend on the lagoon storage and volume with 1 mile setback from dwellings for lagoons of greater than 20-acre feet.

J. Paxton Marshall, Virginia Tech Professor Emeritus of Agricultural Economics (deceased), recommended setbacks of 1 mile from any group facility and .5 mile from any residence for large swine facilities (100 to 250 breeding stock); and for industrial scale operations, (greater than 250 head of breeding stock) 1 mile from residences and 1.5 miles from any group facility, with the possibility of individual waivers if all owners within the prescribed distances waive such setbacks.

[6] In March 1999 EPA and the USDA announced a joint strategy for Animal Feeding Operations. In August 1999 EPA issued a draft "Guidance" for state water discharge permitting of concentrated animal feeding operations. On January 12, 2001 EPA published proposed revisions to the National Pollutant Discharge Elimination System Permit Regulations and the Effluent Guidelines and Standards for Concentrated Animal Feeding.

[7] Illinois Stewardship Alliance.

[8] A University of Minnesota study found that livestock operations grossing under $400,000 a year spent 79% of their business expenditures within 20 miles of the farm; but that larger operations spent only 49%.

[9] The lack of equal bargaining position of the contract growers relative to the corporate integrators has been the subject of recommendations from state Attorneys-General, growers association, and others, for adoption of state laws mandating fair contracting and reporting. In Kentucky, the plight of the contract grower and the adhesion contracts common in the industry drew little legislative attention, until the parallel concept of contracting for tobacco production highlighted the potential for overreaching in such contracts and the need to assure fundamental fairness in contracts that affect the public interest as does agricultural production and the health of the farm economy.

[10] *Kentucky Farm Bureau Federation, Inc., et al. v. Commonwealth of Kentucky, Natural Resources and Environmental Protection Cabinet et al.,* Franklin Circuit Court Case No. 00-CI-00706 (Decided May 25, 2001, decision on Motion to Vacate, Alter or Amend pending).

[11] *Patton v. Sherman and Wunderlich,* Franklin Circuit Court Case No. 01-CI-00660 (2001) pending.

[12] Executive Summary, p.7, *Kentucky farms and markets: emerging policy opportunities,* Office for Environmental Outreach, Kentucky Department of Agriculture

[13] In his essay on the "Top Ten Reasons for rural communities to be concerned about large-scale, corporate hog operations," agricultural economist John Ikerd, of the University of Missouri, Columbia noted the arguments in favor of locating large-scale corporate hog operations in specific rural communities, including jobs, tax base, maintaining the agricultural base, the inevitability of "progress," consumer preferences for uniform quality, and the economy of scale. Ikerd outlined ten top reasons for local communities to be concerned about hosting these facilities: odor, the grueling work, problems with concentration of wastes, lack of consumer benefit, continuing regulatory problems; loss of local control over future of community;
Divisions caused in communities by these facilities; and the degradation of the productive capabilities of rural residents. In concluding that the "solution" of factory farms are really tomorrow's problem disguised, Ikerd notes that in one generation, large-scale industrial livestock operations will wipe out the "vast treasure of public confidence and good will" towards agriculture that has resulted in special privileges, exemptions, and variances to agriculture under a whole host of public policies—from taxation to environmental regulations—because they were trusted to behave in the public interest. The destruction of public confidence in agriculture is a possible outcome of these industrial-scale operations, according to Ikerd.

Additional Readings of Interest

Robins, J. (1992). May all be fed: Diet for a new world. New York: W. Morrow.

Willers, B. (1991). Learning to listen to the land. Washington, DC: Island Press.

Colborn, T., Dumanoski, D., & Myers, J.P. (1996). Our stolen future : Are we threatening our fertility, intelligence, and survival?— A scientific detective story. New York: Dutton.

Redman, N. (2000). Food safety : A reference handbook. Santa Barbara, CA: ABC-CLIO.

Schlosser, E. (2001). Fast food nation : The dark side of the all-American meal. Waterville, ME: G.K. Hall.

Thu, K.M. & Durrenberger, E.P. (1998). Pigs, profits, and rural communities. Albany, NY: State University of New York Press.

Stull, D.D., Broadway, M.J., & Griffith, D. (2000). Any way you cut it meat processing and small-town America. Lawrence, KS: University Press of Kansas.

Fox, N. (1998). Spoiled: Why our food is making us sick and what we can do about it. New York: Penguin Putnam Inc.

Marks, R. (2001). CESSPOOLS OF SHAME- How factory farm lagoons and sprayfields threaten environmental and public health. Natural Resources Defense Council and the Clean Water Network.

http://www.sierraclub.org/factoryfarms/

http://water.nr.state.ky.us/dow/cafo2.htm

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