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Passing the Cluck, Dodging Pullets: Corporate Power, Environmental Responsibility, and the Contract Poultry Grower *

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ABSTRACT Broiler production is concentrated in a few southern states where farmers are highly dependent on contract arrangements for income and livelihood. Poultry is the first animal industry to industrialize and its model of contract farming has been emulated by other animal industries. Environmental standards are becoming increasingly stringent and many farmers are faced with crossroad decisions about investments in dead bird and manure disposal facilities. Asymmetrical power relationships shift waste management responsibilities to growers in a number of ways. This paper details maneuvers poultry integrators use to avoid environmental risk and transfer it to their contract growers. Corporations "pass the cluck" when they shift responsibility for achieving regulatory compliance to the farmer who then must seek technical and financial assistance from public agencies. Poultry integrators "dodge pullets" when they retain ownership of live animals, but dead birds become the farmer's property and disposal problem. Based on fieldwork conducted in Alabama and North Carolina, we develop a perspective for anticipating and understanding the environmental compliance dilemmas facing growers.

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The industrialization of agriculture has been portrayed as a 'third agricultural revolution' (Lobao and Meyer 2001, Bowler 1992). The first had to do with the development of seed agriculture, the plow, and draft animals. The second involved the large-scale purchase of inputs off the farm, especially fertilizers, agrochemicals, and animal feed. The third phase is driven more by technology, the rapid expansion of outputs from farming, and closer relationships between farms and the firms that process and manufacture food (Heffernan 1972; Gregor 1982; Heffernan and Constance 1994).

In this third revolution, American agriculture is undergoing a trend toward fewer and larger farms (Reif 1987; Lobao, Schulman and Swanson 1993; and Lobao 1990). More specifically, there has been an increase in vertical integration and contract production—the industrialization of agriculture (Hoban et al. 1997; 1998). Several recent analyses have examined the trends and spatial patterns of this transformation in animal agriculture (Thomas et al. 1996; Molnar et al. 1996). This growth is brought on by the expanding use of poultry meat in fast food, export demand, and ongoing efforts to reduce fat in diets and eat healthier foods (Boyd and Watts 1997).[1]

Following a continuing wave of consolidation, the U.S. broiler industry is fairly concentrated at around 45 processors. Nonetheless, the top five of these handle more than 50 percent of weekly ready-to-cook production (Watt Poultry 2001; USDA-AMS 1996). Concentrated production of animals on fewer and larger farms, coupled with lower public tolerance for air, soil, and water pollution from such operations, has put new pressure on farmers to improve their environmental performance (GAO 1995; Ward, Lowe and Seymour 1995; Thompson 1995). This paper describes

[1]Lotterman (1998:1) articulates the economic view of the industry "Poultry is the livestock sector that has experienced the greatest success in increasing productive efficiency, whether in terms of cost, feed efficiency or output per worker. It produces the livestock products that have experienced the greatest declines in their real cost to consumers. It is the only livestock sector that has achieved a greater market share and growing per capita consumption over the past 30 years. It is the strongest U.S. livestock sector in terms of competitiveness in world trade."

interactions between farmers, agribusiness firms, and public agencies over waste management in the poultry industry. Based on fieldwork conducted in Alabama and North Carolina, we examine the situation of contract broiler growers who undertake environmental risks on behalf of their agribusiness sponsors.

Corporate environmental responsibility is compliance-oriented. Corporations are motivated to be responsible for the pollution they cause to the extent necessary to avoid liability, yet poultry integrators have evolved a number of protective mechanisms for shifting compliance burdens to growers. Gonzalez' (2001) analysis of corporate power in environmental decisions shows that economic elites theory – power – best explains the course of events in the cases he examines. Similarly, there is a significant stream of literature examining the modes of control used by capital over labor: segmenting markets, deskilling tasks, centralizing decisions, and imposing altered relations of production (Ortiz 2002:406). At base, power asymmetries between family farmers and corporate actors are fundamental modes of control in poultry growing. As will be shown, there are few avenues of empowerment or agency for poultry growers.

Industrialized forms of production organization continue to dominate the animal industries (Harrington and Reinsel 1995). Broiler chicken production is concentrated in a few southern states where farmers are highly dependent on contract arrangements for income and livelihood. Industrialization took place first in the poultry industry and the model of contract farming developed there has been emulated by other animal industries. Vertical integration has transformed the poultry industry into a centrally-controlled, high-volume, narrow-margin production system. It has also increased horizontal concentration in the poultry industry, that is, there is a shrinking number of large firms that process and distribute poultry products.

Concentrated ownership arrangements and the asymmetrical power relationships they impose on growers have important implications for the way environmental regulation is implemented and how the costs of compliance are distributed. Still, there are some unique ways that poultry agribusiness weaves family farming traditions, rationales, and farming-friendly legalities to forestall and diffuse the burdens of environmental regulation. Although Braverman (1998) and others argue that capital uses the division of

labor and scientific management principles to cut labor costs and control the labor process, these principles seem to operate somewhat differently in poultry farming. Grower skills and attentiveness have proven hard to standardize. The scarcity of these specialized attributes helps retard industrial tendencies to control performance and manipulate the production process (Ortiz 2002). Perversely, waste management issues may operate to retain some measure of farmer autonomy and retard the deskilling process as companies seek to protect the illusion of independent grower-contractors to insulate the integrators from environmental compliance liabilities.

Producers, integrators, and regulatory agencies are engaged in a complex set of maneuvers over the way contract growers conduct their operations. The prospect of new large-scale animal production facilities is often a source of community controversy, as a number of human health and environmental problems have been linked to integrated broiler production (Morrison 1998).

Integrators and Producers

In recent decades, companies involved in the production of poultry meat — broilers — for consumer markets have linked the various stages of the process to achieve comprehensive control of the system (USDA-AMS 1996). In this type of integration, companies organize the production of meat through contracts with producers who actually grow the animals (Wilson 1986). Integration is a way for a company to assure itself a reliable supply of meat for processing into consumer-ready products (Bollman, Whitener and Tung 1995).

"Integrator" refers to the company that controls the entire process of animal production, from breeding to delivery as a finished product. The integrator decides which types of animals, how many, what size, where grown, what feeds and medicines are used, how the animals will be processed, and how the finished product is marketed.

"Producer" refers to the individual farmer or grower who raises the animals or poultry under contract with the integrator or as

an independent operator.[2] Producers take delivery of young chicks for grow-out to adult broilers in long narrow buildings called poultry houses. A typical farm may have four such buildings.

Networks of growers are linked to a facility called a poultry complex that coordinates and schedules farm production through a corps of company service representatives (Barkema and Drabenstott 1996; Wilson 1986). A poultry complex is the base unit of organization for broiler production. Breeders, veterinarians, and other technical specialists staff it. The poultry complex is composed of a feed mill, a processing facility, and a surrounding set of contract growers.

The growers receive regular visits by company service representatives. The farms usually are located within 50 miles of the processing facility due to the expense and losses associated with hauling live animals. Similarly, the area served by a poultry complex is limited by costs of trucking the large quantities of feed necessary to grow animals to slaughter weight. Production is usually carried out in relatively warm climates, due to the expense of heating confinement facilities. Chicken processing is neither pleasant nor well-paying work, inducing most firms to locate complexes in small towns with a large supply of low-cost labor (Wright and Cullen 1995).

Poultry complexes often include company-run hatcheries or specialized breeder farms that conduct chick production under contract. Integrators take on the scheduling responsibility in planning production to efficiently utilize processing facilities. They also take on the feed price risk and some of the mortality risk in growing animals. Integrators must be efficient in growing, processing, and

[2] Prior to the expansion of vertical integration, farmers grew the type of animals they wanted and then marketed them as they saw fit. These independent producers paid for their own feed, and accepted the price risk for their animals, as well as the feed costs for themselves. Processors bore the risk of availability of animals of the size and type that they needed for efficient use of their processing facilities. Integrators now organize supply chains from the farm to the retailer. These firms are either family-owned companies or publicly-traded companies. So-called independents are not part of larger multinational corporations, but are individually owned and controlled. Whatever their auspices, these firms make investments in feed mills, trucks, and processing facilities to produce pork, poultry, or eggs.

marketing broilers and the many products derived from broilers—nuggets, wings, breasts, and dark meat. Roy (1972) presents a comprehensive description of broiler contracting and the organization of production. Because grain is about 60 percent of the production cost, good transportation links to grain-producing areas are essential. Proximity to consumer markets is also an asset, as is proximity to port facilities for those companies that export much of their product.

Typically, a poultry complex has a manager for each of its various functions— grow-out, breeding, feed mill, live operations, and processing. The grow-out manager supervises a network of service representatives—the company employees that make regular visits, typically weekly, to advise and direct the growers. Many of these managers are former poultry farmers themselves. Increasingly, college graduates are taking these positions as entry points into the corporation.

Larger firms tend to have more internal specialists—nutritionists, veterinarians, and others—working at the corporate level. The presence of more internal specialists in the larger firms supplants the need for much of the consultation that was formerly provided by Land Grant University scientists and management on disease control and nutrition. This network of company specialists comprises the command-and-control structure that specifies the grower's production process.

Technological change in broiler production—genetics, nutrition, housing, and disease control—is rapid. Every year the average growout period for a broiler chicken tends to shorten by about a day. Change in poultry production technology is not a process of voluntary adoption, but one of compliance with corporate technical mandates. Farmers must undertake practices, install equipment, or implement prescribed procedures. Those failing to readily comply may be sanctioned in a number of subtle and direct ways. Some farmers may receive lesser quality batches of chicks, reflected in higher mortalities and slower growth. Others experience unexpected delays in the scheduling of new flocks. Some farmers may not have their contracts renewed, and the most outspoken growers may have their farms banned from poultry growing altogether. Farmers clearly understand that they are subordinate to company dictates, a fact that clearly limits human agency—the

growers' ability to act on their own behalf in relation to corporate power.

Method

We interviewed industry managers, farmers, representatives of producer organizations and agency personnel at the state level and in two counties in each of the two states. We used a network sampling approach at both levels (Yin 1994). At the county level, (either individually or in focus groups) we spoke with NRCS (United States Department of Agriculture, Natural Resources Conservation Service) personnel (area and county); County Extension staff and area specialists; a sample of producers; and others.

At the state level, we interviewed representatives of the NRCS state offices; extension specialists and researchers at Land Grant Universities; and representatives from other groups. We also conducted focus group interviews with representatives of the integrated swine and poultry companies. The topics covered in the interviews were standardized, but the actual questions flowed from the context of the discussion. Information was collected from approximately 20 NRCS and 20 Extension representatives, as well as about 40 producers through semi-structured interviews, focus groups, and other qualitative methods. Interviews identified strategies that have led to successful relationships and positive program delivery in each of the states for working with industrialized agriculture. In each state, we focused on two counties undergoing rapid changes in the industrialization of agriculture.

Two counties in Alabama were selected for intensive study. One is in the northern Appalachian region. It is the number two producer of broilers and the number one producer of swine in Alabama. The other is a southern, rural, coastal plain county. It is fifth in broiler production (although it is the top producer in lower Alabama) and is eleventh in hog production. Both counties are located on pollution-vulnerable sandy soils with underlying limestone karst structures.

Of the two North Carolina study counties, one a rural county and the top producer of hogs and turkeys, and in the top five for broilers. There has been an active USDA water quality demonstration project there for the past five years. The second is a more urban county (with a city of 30,000) located just north of the other. It has the following agricultural rankings in the state: third in hogs;

seventh in broilers; and third in turkeys. Both counties are on the coastal plain and face important water quality concerns pertaining to the permeability of the soils, the underground structure of water channels, and surface water resources.

There are major differences between North Carolina and Alabama in the areas of public policies and regulation. North Carolina has enacted much more stringent regulations on the swine and poultry industry. The regulations have caused a major shift in waste management decision-making and practices, especially for swine producers. Alabama's environmental management agency has roughly six staff in the enforcement section for agriculture, forestry, and mining; there are over 100 staff members in the equivalent group in North Carolina. The states are nearly equal in surface area.

Another point of contrast is the growing presence of the integrated swine industry in North Carolina. The state has become second in the country in swine production. North Carolina is also near the top in poultry production. Alabama has just started to experience a significant increase in contract swine production. Alabama is third in U.S. broiler production. Some of the most intensive broiler production areas in the United States are found there. Although hog farm impacts are a salient public issue in North Carolina and somewhat less so in Alabama, this analysis focuses on the dilemmas and contradictions of environmental management of broiler production found in both states. Public agencies are playing an expanding role in determining how animals are produced because concentrated animal feeding operations require permits to operate. Such permits are granted only when facilities are designed to specifications and operations meet standards verified by periodic inspection.

Integrator and Producer Perspectives

Contract Production

One federal study of industry concentration in the vertically-integrated animal industries found that contract production may provide financial stability, reduced risk, and the ability to attract loans from financial institutions that allowed them to stay on the farm or to enter the industry for the first time. It appears that in

those regions of the country where integrators are in competition for contract growers, the terms of the production contracts are more generous than in areas where a single integrator predominates.

On the other hand, vertical integration trends raise at least two very important long-term issues: 1) an imbalance of power between the integrator and the producer, and 2) environmental problems associated with the extreme concentration of animal and processing waste (Lowe 1997; Weida 2000).

Most rural communities in the Southeast are receptive to broiler complexes because broiler contracts tend to stabilize farm incomes and create employment in feed mills, processing plants, and construction (Heffernan and Lind 2000; Heffernan and Hendrickson 2002). Given that the benefits of formerly lucrative farm programs favoring tobacco, peanuts, and cotton have been dramatically diminished, the relatively steady revenues from broiler production seem understandably attractive to many farmers. Integrators have no trouble recruiting applicants for production contracts. As an approach to rural development, it is not clear how the impacts of broiler industry development are distributed or how the generally broad public tolerance for broiler production's odor and water quality impacts can be expected to endure (Buttel 1980; Cardwell 1991; and Thompson, Matthews and van Ravenswaay 1994).

In general, farmers find broiler contracts to be a desirable farm enterprise. Informants estimated that there were two farmers waiting to become a broiler grower for every farmer currently under contract. Low-performing farmers can lose contracts, but the turnover in each county tends to be low.

During a period of corporate disquiet over its profit levels, however, one south Alabama integrator made a large number of changes among the growers it had under contract. A number of disputes with growers took place over the accuracy of feed delivery weights and other aspects of the company-grower relationship. A number of contracts were not renewed. The company blacklisted one grower's farm (i.e., no contracts would be given to the farm regardless of ownership). This vindictive step presumably would reduce the market value of the farm or at least the ease at which it might be sold. At the time only two integrators operated in this county, so the blacklisting was a serious threat to the farmer's livelihood.

A broiler grower association does exist in Alabama, but it is an entity largely funded by integrators. Some efforts were underway to form an independent grower association, but it has been met by widespread fear and suspicion. Nonetheless, unrest among farmers in the North Alabama area led one large cooperative to extend the term of its grower contract to as long as four years. About six different integrators operate facilities in this part of the state, and good growers have alternatives. The cooperative also was under some criticism for not offering better conditions and terms to its grower-shareowners than the privately owned corporations.

Zhao's (1995) study of Texas contract broiler growers showed that top producers are conscientious about conducting their business. Their success is not necessarily based on years of experience, but rather on excellent facilities that are operated under close scrutiny. Top growers tend to be better educated, with better facilities and equipment that are isolated from other poultry farms, and their daily management style tends to be more intensive than that of growers in the bottom group.

Waste Management and Odor Control

While water pollution, flies, and odor have always been problems with livestock farming, the trend toward industrialized approaches exacerbates the neighbors' problems. First, with larger operations, the impacts also are larger. Second, environmental regulation of soil phosphorous levels present new limits on old patterns of repeated land application of animal waste that we now understand to compromise water quality. Third, most poultry growers live on the farm and share their neighbors' olfactory experiences, but increasingly many do not. In addition, large processing facilities may tax local community water systems and natural groundwater capacities due to the large amount of water needed for waste disposal and stock watering.

In some states, large operations must meet permit requirements for lagoon standards, available acreage for land spreading, and other requirements designed to reduce the probability of an groundwater pollution or waste spills into local water bodies or

streams.[3] Still, any incident involving a very large facility will have effects far beyond similar incidents at smaller operations because of the larger amount of material involved. Air quality, waste, and dead bird disposal are key issues for the contract poultry grower.

Air quality. Odor control is a topic of intense research and development. Odors emanate from live animals during the production process, from manure management systems, from dead animal disposal, and from processing plants. Odors, ammonia, particulates, flies, and other airborne impacts of live animals are directly unpleasant and present health effects to the animals themselves, to farm workers, and to surrounding communities.

Poultry waste and dead bird incinerators also have odor impacts. Flies and the smell of poultry waste are central themes of conflict with neighbors and communities for poultry producers, but most regulatory attention focuses on nutrient management and the disposal of dead birds.

Proper waste management protects groundwater, stream quality, and human health. The main source of environmental concern is the extremely high level of phosphorous that characterizes soils in areas subjected to many years of repeated land application of poultry litter. Poultry waste thus presents a distinct set of environmental problems and corporate arrangements to shift responsibility.

Dry Waste. A dry waste system is typically used in broiler houses and many layer houses. Instead of waste dropping through open slats in house floors, a bedding material (usually wood shavings, sawdust, peanut hulls, or rice hulls) is placed on the ground in the house. The waste mixes with the bedding material and both are removed after one or more grow-out cycles. This mixture is known

[3]Animal feeding operations (AFOs) are agricultural enterprises where animals are kept and raised in confined situations. AFOs congregate animals, feed, manure and urine, dead animals, and production operations on a small land area. Feed is brought to the animals rather than the animals grazing or otherwise seeking feed in pastures, fields, or on rangeland. There are approximately 361,000 AFOs in the United States. Larger AFOs—more than 1,000 animal units—are termed confined animal feeding operations (CAFOs) and are mores strictly regulated and monitored (EPA 2001).

as litter. Approximately one-half pound of litter will be generated for each pound of market weight broiler chicken produced. For a producer with two broiler houses that raises six batches of 4-pound birds, 336 tons of litter per year must be used or disposed. Two million tons of broiler litter are produced in Alabama each year.

Producers have three options on what to do with the litter that is left in the house after birds are removed. The producer can *sell* it, *spread* it on land as fertilizer, or *feed* a mix of litter and grain to cattle.

If the producer *sells the litter*, it can be removed from the houses by a custom clean-out business. Manure brokers will clean out poultry houses and haul the material away. In turn, crop farmers can arrange the application of poultry litter to their fields for as little as a tenth of the cost of chemical fertilizer. In a cycle of very low cattle prices, the ability to substitute up to half a cow's ration of purchased grain (or pasture grass) with broiler litter is a distinct advantage. The manure market is driven by grain prices and trucking costs. The emergence of manure brokers and area wide markets is an encouraging trend as it reduces surpluses in some areas, recycles nutrients where they are needed, and saves farmers money.

For example, the current rate for litter removal and disposal is around $6 per ton. If the farmer sells it this way, it eliminates the need to keep equipment such as tractors with scraping blades and front-end loaders. There exists a market for chicken litter, both for feed and for fertilizer. Litter usually sells for around $30 to $35 per ton when delivered to the buyer.

Regulations limit when the producer *spreads the litter on land*, but otherwise there are few restrictions. Recent efforts to limit land application of manure to periods when green plants could utilize nutrients were overturned by the political efforts of the growers. Extension recommendations in Alabama allow up to six tons per acre per year to be spread on land that is not highly sloped; the maximum for single annual applications is four tons. This recommendation is for twice-a-year application. Each state has its own recommendations and restrictions on the use of poultry litter.

Alabama, for example, prohibits litter spreading 150 feet from wells or springs, and 100 feet around streams and ditches. Unfortunately, farmers tend to spread litter in the early spring when monthly rainfall tends to be highest and there is less foliage to

reduce water flows. In some areas where broiler houses are concentrated, extensive land application of litter can contribute to excess nutrients in groundwater and streams.

Over-application of chicken litter is associated with concerns about nitrogen and phosphate levels on land that has received repeated applications of animal waste. Excessive phosphate loading is the long-term environmental problem linked to this practice. Spreading animal waste in close proximity to streams and other waterways is restricted in both states. Waste from industrialized animal production facilities is problematic because of nutrients, antibiotics, and microbes that may be introduced into streams and ground waters. High nutrient levels foster alga blooms and subsequent oxygen depletion that leads to fish kills. Excess antibiotics may induce the growth of drug-resistance bacteria with significant implications for humans and animals. Animal waste nutrients can facilitate the growth of *Pfiesteria piscicida* and other bacteria linked to North Carolina fish kills and human symptoms.

Chicken litter *can be fed to cattle*. Broiler litter is particularly advantageous for sustaining brood cows in cow-calf beef production systems that do not require intensive levels of management nor high quality feeds. In this way, litter is recycled as animal feed to supplant purchased rations and save money for the cattle producer. The litter is placed in a dry-stack storage area and covered with plastic (for at least 20 days). After it has gone through a "heat" which kills organisms present in litter, the litter is then mixed with grain—typically a mixture of about equal parts cracked corn and chicken litter. This makes an inexpensive ration for cattle, and is often used for feeding brood cows and stocker cattle.

There is a 15-day withdrawal period for cattle to be taken off any litter ration before slaughter. No feeding of litter is allowed for lactating dairy cows. Because of its value as a feed, many producers that have broiler operations also have beef operations. This natural synergy is widely used by cow-calf producers. Farmers also employ systems that apply litter or waste to pasture or forage which then is fed to cattle.

Liquid Waste. Liquid waste is not generally an issue for broiler production because the birds are raised on beds of wood shaving or peanut hulls over bare earth. The mixture of bedding, liquid, and solid waste is replaced after as many as three batches of broilers have been grown. Liquid poultry waste emanates from flush

systems in egg-laying hen houses that were not at issue in this study. These systems use periodic surges of water to move waste to lagoons for bacterial digestion.[4] Liquid waste is more problematic for farmers due to its odor, the intensive amounts of nutrients present, potential for fecal coliform contamination, the smell and groundwater risks of land application, and the periodic need to re-excavate lagoons and dispose of accumulated solids.

Current trends are toward dry handling of poultry manure to reduce burdens in subsequent stages of waste management ("a gallon of water and a gallon of manure equals two gallons of manure"). Waste from large animals is primarily treated in lagoon systems for subsequent land application, but breeder and layer houses produce sufficient volumes of liquid waste that may require lagoon systems as well.

Public agencies endeavor to promote the view of animal waste as a resource. This is most true for poultry manure and most problematic for swine waste. Farmers and others increasingly recognize the value of poultry waste as a substitute for corn in beef cattle feed and chemical fertilizer in crop production. Yet, environmental regulations are still another factor favoring the larger landowner with access to capital to make the necessary improvements and stay in business. In exploiting the synergism between poultry production and other farm enterprises, larger farms also are at a distinct advantage. Growers with more acres of cropland are

[4] When using liquid systems, the waste is flushed into a lagoon where it is decomposed by bacteria. After the waste has been biologically treated in a lagoon, the liquid effluent is pumped from the lagoon and applied to land. The most common land application technique employs a tank spreader or "honey wagon." Lagoon waste is placed in a special tank trailer, which sprays liquid as it is pulled across the field. Some farms use an irrigation system to pump waste directly onto land, but this is less common among poultry farmers. A more recent approach is to knife or inject the liquid waste directly into the root zone so plants can more directly use the nutrients. Due to the large volumes of waste in lagoon systems, irrigation is generally the only practical and economical alternative. Although short-term odor problems may be increased, longer-lasting effects are reduced, as is runoff potential.

less constrained on the size of the poultry operation they can undertake as they have more land to spread waste.

Dead Animal Disposal as an Environmental Responsibility

Dead bird disposal is a constant concern for poultry growers. Some level of mortalities is always to be expected. In a curious twist, the integrator owns the birds while the farmer is caring for them. However, a dead bird becomes the farmer's property and the farmer's problem. Similarly, the company owns the feed that is regularly delivered to the farm, but the waste that remains is the farmer's property and disposal responsibility. In this way, the companies "dodge dead pullets."[5]

Contract incentives lead growers to take many small steps to ensure the survival and viability of their flocks, such as heating the ground in anticipation of a new batch of chicks. Such attention to detail is reflected in the compensation farmers receive based on the relative performance with their flock. Through a complex set of computations—that integrators view as proprietary information—farmers compete against their peers who received batches of chicks at about the same time they did. Dead birds at the processing plant and condemnations (birds deemed unacceptable due to physical defect or deformity) reduce the payment farmers receive.

Mortality rates, the incidence of dead birds experienced by grower and integrator, are closely watched by all parts of the industry. A basic principle of disease is that pathogens spread more easily, and epidemics are more severe, when the hosts are more uniform and abundant—many thousands of birds in a poultry house. Mortality rates reflect on the management skill of the grower and the income to be derived from the enterprise. Unexplained mortalities are a great fear for grower and integrator alike.

Avian diseases—known and unknown—are a central economic threat to the industry. The total condemnation of a farm's or a company's production is a devastating prospect. As a consequence, many of the steps taken in waste management are intended to protect the environment, but there is also a long-term benefit to the industry in reducing the risk of disease and mortality.

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[5] Technically, a pullet is a hen less than one year old.

After receiving a new flock, the producer will check the houses each day and remove any dead birds. Under the conditions of grower contracts, dead birds are the responsibility of the producer. Although state rules require disposal of all animal carcasses within 24 hours after death, poultry mortalities are more strictly regulated because of the potential economic losses posed by diseases spreading rapidly in large populations under confinement. The State Veterinarian has very strong emergency powers to condemn whole flocks, shut down farms, and otherwise implement measures to contain disease outbreaks.

Simple burial of dead birds in earthen pits has been outlawed for some time — except with permission from the State Veterinarian's office when there are disastrous losses. Under normal circumstances, the producer's options are *incineration, composting, or recycling* the birds through a rendering plant.

Incineration is an option for on-farm disposal of dead birds. A producer can purchase a State Veterinarian-approved incinerator and use propane or diesel fuel to burn the dead birds each day. An incinerator's output is mostly ashes, is of much less volume than compost material, but is of limited agronomic value. Incinerators do represent an additional capital cost and an operating cost for fuel, but they require less labor. For some smaller-scale farmers, incinerators are a safe, legal, and economical choice.

Composting is a process done on the farm where dead birds are biologically reduced to a soil amendment. Dead birds must be stacked, watered, and covered with litter on a daily basis. They go through an aerobic "heat" cycle where the mixture temperature reaches over 150 degrees. The primary composting lasts about three weeks. Then the mixture is "turned" as it is moved to a second composting bin and allowed to go through a second "heat." The resulting compost is then suitable for spreading on cropland.

Compost facilities are more complex than commonly understood by those outside the poultry industry. They are typically less expensive to operate than incinerators, but they have higher initial costs. To use this process, the producer must build or modify an existing building to include a concrete floor, a roof, and compartments for primary and secondary composting. A composter building for a farm with four houses can cost from $12,000 to $20,000. The

farmer also may need a tractor with a front-end loader to move the dead birds and cover them with litter.

For disease control reasons, State regulations do not allow transport or off-farm use of dead-bird compost. The extended attention required for the management and use of a compost facility are offset by the avoided propane and equipment costs, as well as the fact that the compost is of high agronomic value. To facilitate producer compliance with environmental regulations, several different loan and cost share programs are available to help producers purchase equipment and build facilities for dead bird and waste disposal

Recycling through transport to a rendering plant is a third legal option for producers. The protein and other material are recovered for use in animal feed and other applications. Rendering plants use dead birds and waste from meat processing operations to create by-products used in other animal feeds. Regulations require that dead birds must be delivered daily to the rendering plant and transported in a closed container. This is an attractive option for those that live near a rendering plant, but there are not many of these plants available to producers. In some areas, commercial services collect dead birds from poultry farms.

A related option that is currently being used in some states involves *frozen storage* on the farm. Operators store their dead birds in a freezer and a contract company picks up the frozen birds for delivery to a rendering plant. In this case, the producer or the contract company obtains a freezer and the producer pays the contract company for removing the dead birds. New technology under development will provide other processing and storage strategies.

Most producers use these disposal methods, but dead birds dropped on a roadside, in a ravine, or in a streambed present problems for local authorities. Improper disposal threatens surface and ground waters, endangers the health of other growers' animals, and violates human aesthetics of sight and smell. In some cases, county sanitarians, county health departments, and even the county Sheriff may be called upon to enforce a fragmented patchwork of laws that apply to different sets of circumstances defined by where and how the birds were improperly disposed.

Conclusion: Passing the Cluck, Dodging Pullets

Environmental standards are becoming increasingly stringent and many farmers are faced with crossroad decisions about investments in dead bird and manure disposal facilities. Family farms that develop contract relationships with integrators enjoy some level of continuity and insulation from market swings. On the other hand, poultry producers are in a very asymmetrical relationship with the integrator. Contracts can be terminated nearly any time, yet growers often undertake long-term financial obligations to meet technological requirements set in production contracts. Growers undertaking 14-year loans for new poultry houses with tunnel ventilation systems have a lot to lose if their contracts are not renewed or they experience undue delays receiving new flocks of birds for grow-out. State laws or the countervailing influence of organized poultry grower associations rarely check the dependence associated with these risks and the corresponding power of the poultry integrator.

The central consequence of such power imbalances in the poultry industry is reflected in the title of this paper "passing the cluck." That is, farmers are expected to absorb the costs and uncertainties of waste disposal with little or no corporate assistance. They must do so in the context of an accelerating treadmill of environmental regulation and public skepticism about industrialized animal production. The realities of concentrated corporate control of vertically-integrated production processes — in contrast to the spatially-dispersed, politically-fragmented, and contractually-dependent growers — suggest that changes in this relationship can only be altered by the actions of government and environmental groups.

The integrators "dodge (dead) pullets" by immediately passing ownership and responsibility for dead birds to the grower. Regulatory compliance is left to the farmer who must seek technical and financial assistance from public agencies to avoid prosecution and retain eligibility for production contracts. Waste management issues may operate to retain some measure of farmer autonomy because the integrators do not wish to assume the liability of dead bird and manure disposal. Because farmers are portrayed as independent contractors and not employees, the firms are insulated from some known costs and some unknown liability risks from the by-products of the production process. There is some evidence that

regulators are endeavoring to shift some compliance costs and responsibilities from growers to integrators, but litigation and political resistance to the integrators is led by environmental groups and not by grower associations. Any empowerment that accrues to poultry growers in the process will likely occur as a by-product and not a direct objective of efforts to improve the environmental performance of the broiler industry.

Poultry integrators need farmers' labor, management skill, and oversight to meet contract commitments and keep processing plants busy. They also need the growers' pasture and croplands to absorb the environmental residuals generated by the production process. On the other hand, integrators need no single farmer to stay in business, and they assiduously counter any sign of independence or effort to engage in collective resistance. One integrator blacklisted a truculent grower's property—forever banning it from production contracts—thus foreclosing his opportunities in broiler production and lessening the value of his land.

Nonetheless, integrators will continue to need family farms to absorb risk, disperse environmental impacts, and provide a malleable labor force to implement a continuous stream of changing technology. Poultry industry structures and relationships may be an unfortunate model for other animal industries in an era of industry overcapacity and rising health, safety, and environmental standards. A compliant subset of technically-adept producers will have a protected, if subservient place in the future in broiler production and the other meat industries. Producers who are not accepted by or do not want to ally themselves with integrated production systems will be forced to seek other forms of livelihood in niche markets, direct links to consumers, or other organizational forms that offer alternatives to the industrialized structures that dominate the food system today.

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