

The Inevitable Economic, Ecological, and Social Consequences of CAFOs^{lii}

John Ikerd^{liii}

I have spent much of my life involved with animal agriculture, either directly or indirectly. I grew up on a small dairy farm in the state of Missouri, which is in the central part of the United States. When I graduated from the University of Missouri with a Bachelor of Science degree in Agricultural Economics in 1961, I took a position with Wilson & Company, the fourth largest meat packing company in the U.S. at that time. I worked with Wilson & Co. for three years before returning to graduate school at the University of Missouri, where I received Master of Science and Doctor of Philosophy degrees in Agricultural Economics.

Upon receiving my Ph.D. degree in 1970, I took a position at North Carolina State University with responsibilities for research and extension education related to livestock marketing. Over the next 15 years, I conducted research related to livestock marketing and worked directly with livestock producers. I moved from North Carolina to Oklahoma in 1976, where the responsibilities of my faculty position at Oklahoma State University also focused on livestock marketing. I moved to Georgia to accept the position of Department Head for Extension Agricultural Economics at the University of Georgia in 1984. My academic responsibilities in Georgia focused more broadly on agricultural policy, but I maintained a continuing interest in animal agriculture. I finished my 30-year academic career at the University of Missouri working on issues related to agricultural sustainability. I have written several popular articles over the years about the essential role of animals in sustainable agricultural systems. Since retiring in 2000, I continue to be a proponent of *sustainable* animal agriculture.

Professional Experiences with CAFOs

I first became involved with the controversies surrounding large-scale confinement animal feeding operations (CAFOs) in the mid-1990s. A group of farmers I was working with in north Missouri asked me to review a 1992 report written by one of my agricultural economic colleagues. The report praised the potential of producing hogs in CAFOs as a rural development strategy. In the report, CAFOs were promoted as a means of providing new employment opportunities for economically depressed areas of rural Missouri. The farmers didn't agree with my colleague's conclusions. I was familiar already with contract hog production. In fact, my first Experiment Station Report had dealt with contractual integration of the North Carolina hog industry. So, I agreed to review the report.

After reviewing the report, I decided to compare the employment potential of CAFOs to employment reflected in actual farm records for Missouri hog producers compiled by the University of Missouri. I concluded that CAFOs would actually employ far fewer people than the number of independent Missouri hog farmers that would be displaced by the expansion of CAFOs in the state. The conclusions in my report were not acceptable to many of my colleagues at the University. It was demeaned, dismissed, or ignored by my colleagues and by the agricultural industry. CAFOs were welcomed into Missouri and

within the next ten years 90% of Missouri's independent hog producers were forced out of business by competition from CAFOs, largely validating the results of my study.

In spite of efforts to discredit it, my report was published as chapters in a couple of different books.^[1] Copies were also widely distributed among people in rural America who were confronted with the prospect or presence of CAFOs in their communities. Over the years since, I have worked with dozens of grass-roots community groups in 16 states in the U.S. and 4 provinces of Canada. I have listened to the stories of people in all these communities and have participated in their public meetings and official hearings. I have not sought out these contacts and have not worked with these people as a paid consultant. I have never taken a consulting fee or speaking fee from any of these grass-roots community groups. All I ask is that I be reimbursed for travel expenses. I continue to do this work only because very few economists seem willing to tell the economic truth about CAFOs. I have learned as much as I have taught in the process of working with many of these well-educated and informed, thoughtful and caring people.

Inevitable Consequences of CAFO

In supporting these grass-roots groups, I have reviewed countless studies prepared by highly reputable research institutions. For example, a 2006 study commissioned by the State of North Dakota Attorney General's Office provides a review of 56 socioeconomic studies documenting the negative social and economic impacts of CAFOs on rural communities. The study concluded:

Based on the evidence generated by social science research, we conclude that public concern about the detrimental community impacts of industrialized farming is warranted. In brief, this conclusion rests on five decades of government and academic concern with this topic, a concern that has not abetted but that has grown more intense in recent years, as the social and environmental problems associated with large animal confinement operations have become widely recognized. It rests on the consistency of five decades of social science research which has found detrimental effects of industrialized farming on many indicators of community quality of life, particularly those involving the social fabric of communities (emphasis added).^[2]

The Johns Hopkins University Bloomberg School of Public Health maintains a website providing hundreds of references to scientific evidence concerning the contamination of air, water, soil, and foods with toxic chemicals, infectious diseases, antibiotic resistant bacteria, and E. coli 0157:H7.^[3] A 2004 Government Accounting office (GAO) report linking antibiotic resistance to CAFOs states:

We found that only a few studies have concluded that the risk is minimal, while many studies have concluded that there is a significant human health risk from the transference. Antibiotic-resistant bacteria have been transferred from animals to humans, and many of the studies we reviewed found that this transference poses significant risks for human health. Studies have shown two types of evidence related to the transfer of antibiotic-resistant bacteria from animals to humans. First, some studies have provided evidence of associations between changes in antibiotic use in animals and

resistance to antibiotics in humans. Second, studies that have examined the genetic makeup of the bacteria have provided evidence of a stronger link and have established that antibiotic-resistant campylobacter and salmonella bacteria are transferred from animals to humans.^[4]

The American Public Health Association called for a nationwide moratorium on CAFOs in 2003, citing compelling scientific evidence of public health concerns related to CAFOs.^[5] A prestigious 2008 commission funded by the Pew Charitable Trust a nonprofit organization committed to rigorous, analytical and evidence-based work to inform public policy, concluded:

The current industrial farm animal production system often poses unacceptable risks to public health, the environment and the welfare of the animals. The negative effects of the system are too great and the scientific evidence is too strong to ignore.^[6]

These reports reference hundreds of other scientific studies linking CAFOs to negative economic, social, ecological, and public health impacts of CAFOs.

It is not necessary to replicate these previous reviews of scientific literature to anticipate or foresee the negative impacts of CAFOs on rural communities and societies. Such reviews simply confirm conclusions that can be drawn from a logical and rational assessment of fundamental characteristics of CAFOs. Such conclusions are not unique to any particular geographic location or to any nation. The consequences are quite similar, if not identical, for the U.S., Europe, China, South America, or anywhere CAFOs locate. The economic, ecological, and social consequences of CAFOs are inherent within the fundamental *structure* of CAFOs.

In other words, the consequences of CAFOs are inevitable, regardless of where CAFOs are located or how they are operated. A particular individual CAFO may be designed and operated in such a way as to avoid these consequences for some specified period of time. *However, the economic, ecological, and social consequences are inevitable for any significant group of CAFOs at any point in time and for any individual CAFO over a significant period of time.*

The basic *structure* of any organization, including a CAFO, is a reflection of its fundamental *purpose*, meaning its reason for functioning or being in operation. An organizational structure is defined by the activities or functions of the organization, such as assignment of specific tasks and the coordination and supervision of operations, all of which are directed towards the achievement of the organization's aims or purpose. Structure determines which individuals get to participate in which decision-making processes, and thus their ability influences an organization's actions or functions. The basic structure of a particular type of organization provides the foundation for standard operating procedures and functional routines in all organizations of this particular type. All CAFOs share a common purpose and share a common type of organizational structure.

The primary purpose of all CAFOs is economic. No other significant logical reason has been put forth by proponents of CAFOs other than to increase the *economic efficiency* of animal production. Economic efficiency increases the opportunity for those who control CAFO operations to increase their profits or wealth. CAFOs share an *industrial* organizational structure, which is a logical reflection of their economic purpose. CAFOs are specialized, standardized, and centralized or *hierarchically-controlled* business organizations. The structural characteristics of specialization and standardization are essential to facilitate the economic efficiencies that naturally arise from large-scale, hierarchically-controlled business organizations.

Many people equate industrial organizations to the migration of people from farms and rural communities to manufacturing jobs in urban areas. However, the shift from farming to manufacturing was only a symptom of the industrial model or paradigm of organization. Specialization increases economic efficiency through *division of labor*. People specialize in specific tasks in order to carry them out more efficiently. Standardization is then necessary to facilitate coordination of specialized production processes. The specialized functions must be standardized if they are to fit together effectively without wasted time or energy. Standardization allows routinization, simplification, and mechanization of production and management processes. This allows consolidation or centralization of control into large-scale, corporately-controlled business organizations. These are precisely the fundamental characteristics of CAFOs: They are specialized, standardized, and hierarchically-controlled, industrial organizations.

The industrial business structure is widely used in all so-called developed economies. The primary economic advantages of industrial organizations arise from reducing the economic cost of labour and management. Since specialized workers are generally more efficient, fewer workers are required to produce an equal or larger amount of output or production. In addition, as specialized tasks are routinized, simplified, and mechanized, the skill level of workers can be reduced, meaning workers ultimately can be paid lower wages. In addition, decision makers are able to manage larger numbers of lower-skilled workers carrying out more-routine tasks. This allows the consolidation of industrial enterprises into larger business organizations. Corporations have emerged as a primary means of amassing the large amounts of capital needed to finance large, industrial organizations.

Agriculture was among the last economic sectors to become industrialized, because farming simply did not easily accommodate the specialized, standardized, centrally-controlled organizational structure. Industrial agriculture was made possible only by the development of sophisticated mechanical, chemical, and biological technologies: Notably commercial fertilizers and pesticides for agricultural crops and climate-controlled buildings and antibiotics for farm animals. All of these technologies have an inherent potential for adverse ecological, social, and public-health consequences for people in rural communities and for national and global societies. *CAFOs are the epitome of industrial agriculture.*

Economic Consequences of CAFOs

The economic impacts of CAFOs are inevitable consequences of their industrial organizational structure. Claims in support of CAFOs are invariably economic in nature, as would be expected of industrial enterprises. Proponents promote CAFOs as a means of rural economic development for economically depressed rural communities, as was the case in Missouri. They point to the numbers of people who will be employed in CAFOs, providing new job opportunities for locally unemployed workers as well as workers who will move into the community. More workers will mean more economic activity and more local tax revenues. They point also to new investments in CAFOs as sources of property tax revenue to support local public services, such as roads, schools, police protection, healthcare, and other social services.^[7]

The consequences of CAFOs are quite different from the claims of their promoters. CAFOs inevitably employ fewer people in the process of producing a given number of animals than do non-industrial farming operations. Lower profit margins per animal are acceptable to CAFO operators because each operator is able to manage a significantly larger number of animals. Independent producers are unable to compete at such margins. The number of independent producers displaced by CAFOs is inevitably greater than the number of people employed by CAFOs. Following the advent of CAFOs in the U.S., between 1980 and 2008, the U.S. Department of Agriculture statistics indicate the number of beef cattle operations fell by 41%, the total number of hog farms declined by 90%, and the number of dairy farms fell by 80%.^[7] Between 1992 and 2004 alone, the number of hog farms fell by more than 70 percent, whereas the hog inventory of total hog numbers remained stable.^[8] The CAFOs weren't producing more hogs; they were just producing a similar number of hogs with far fewer farmers.

Admittedly, the communities where CAFOs locate may experience increases in local employment, even if it comes at the expense of larger reductions in employment elsewhere. However, local workers rarely make up a majority of the workforce in CAFOs. Work in a CAFO is fundamentally different from work on an independent farming operation. First, virtually all CAFO operations eventually are controlled through comprehensive contractual arrangements with a few large agribusiness corporations. All of the important decisions in such CAFO operations are made by contract supervisors or executives in corporate headquarters, somewhere outside the local community. In addition, environmental conditions in CAFOs are at best unpleasant and quite typically dangerous to the workers' health and safety. As a result, local workers who are accustomed to making their own decisions and working in a humane environment typically do not work for CAFOs, as least not for very long.

The poor working conditions, lower-skilled work, and pressures for lower labor costs, typically result in CAFO workforces composed largely of *migrant* workers who are desperate for employment. According to a University of Wisconsin study, the percentage of migrant workers on Wisconsin dairy farms increased from 5% to 40% between 1998 and 2008, years of rapid growth in dairy CAFOs.^[9] Wisconsin did not lack local workers with experience in dairy operations when CAFOs began to take over its dairy industry. Most dairy operations in Wisconsin are still not CAFOs, so the percentage of migrants will almost certainly continue to rise with rising numbers of CAFOs.

Workers who migrate into CAFO communities for employment, often from less-developed countries, typically place a far larger burden on local public services particularly schools, police protection, and public health care than their meager wages yield in local tax revenues. In addition, the traditional rural culture of CAFO communities is often changed by the new immigrants, particularly if the CAFOs are accompanied by a packing or processing plant. In addition, CAFOs and associated facilities often are granted preferential tax rates or are under-assessed for real estate tax purposes. As a result, any increase in property taxes is typically more than offset by increased costs of road maintenance resulting from increased heavy truck traffic, increased water treatment costs, and other public infrastructure expenses. Rather than flourishing economically, CAFO communities face even greater economic challenges.

These are inevitable consequences of the organizational structure of CAFOs. The greater potential economic efficiency of CAFOs does not translate into positive economic development for rural communities. On many occasions over the years, I have challenged CAFO advocates to identify a single rural community in the U.S. where CAFOs have become a defining characteristic of their economy is considered to be a desirable place to live, economically or socially. No one has yet even attempted to respond to my challenge. Such communities instead are looked upon with sympathy by other communities, as places that were so uninformed of the consequences or so desperate for economic development they have created places where only similarly dirty and undesirable industries are willing to locate. The socio-economic future of such communities is greatly diminished by the presence of CAFOs.

Those who are skeptical of economic development benefits are frequently told that if their communities don't accept CAFOs, they will simply locate in another nearby community. The rejecting community might then suffer many of the potentially harmful effects of CAFOs without gaining any of the potential economic benefits. The proponents also claim that CAFOs are the logical future of animal agriculture because they have the ability to reduce the costs of meat, milk, and eggs for consumers. They say consumers will naturally choose the lowest priced food products, so CAFOs are the inevitable consequence of free-market economies. They conclude that CAFOs are the inevitable future of animal agriculture and communities that reject them will destroy the future of their agricultural economy.

Again, the consequences of CAFOs are quite different from the claims of their advocates. Admittedly, CAFOs may locate in another nearby community, but only if such communities are uninformed about the economic, ecological, and social consequences of CAFOs. Eventually, when all rural people are adequately informed, CAFOs will not be welcomed into any community. In the meantime, being located in a community without CAFOs is better than being located in a community with CAFOs, or better yet living in a nation without CAFOs is better than in a nation with CAFOs economically as well as environmentally and socially.

Contrary to popular belief, the growth in popularity of corporate CAFOs does not necessarily mean that CAFOs are more economically efficient than well-managed independent farming operations. CAFOs need only be more efficient than the least-efficient one-third to one-half of independent producers to gain a comparable share of the market by displacing less-efficient producers. Thus, CAFOs can gain the power to influence markets even if they are less economically efficient than the most-efficient one-third to one-half of independent farmers. Once they have control over one-third to one-half of the market, they are able to manipulate markets to their advantage, eventually displacing even the most-efficient independent producers.

Most CAFO contractors are vertically integrated, meaning they control more than one stage in the production process. CAFO contractors typically are involved in slaughter and processing as well as contract production. Periods of cyclical oversupply are common in agricultural markets, which periodically depress market prices for live animals. In such cases, retail and wholesale prices eventually are reduced to clear markets of surpluses, which allow prices at the farm level to rise. However, the vertically-integrated CAFO corporations can keep retail and wholesale prices high during such periods, which keep live animal prices low enough for long enough to force independent producers out of business. This is the means by which less-efficient CAFO operations have been able to displace more-efficient independent producers. Once CAFOs dominate a market, periodic oversupply situations are addressed by manipulating or cancelling contracts with growers, which keeps retail prices high and corporate margins at profitable levels for stockholders.

All of these negative economic consequences are inherent within the industrial organizational structure of CAFOs. Contrary to claims by proponents, CAFOs do not necessarily result in lower prices for meat, milk, and eggs for consumers, even if they are more economically efficient. The U.S. Department of Agriculture statistics clearly show that retail prices for meat, milk, and eggs have continued to rise, in some cases dramatically, during those periods when animal production was moving off of independent family farms and into contract CAFOs.^[10] The only significant exception was during the early phases of industrial poultry production, when new cost-reducing technologies were employed by corporate poultry contractors that could just as easily have been employed in smaller, independent poultry operations.

As the market power of corporate contractors grows, the price spreads widen, between prices paid by consumers for animal products at the retail level and the prices received by producers for live animals. This leaves retail prices for meat, milk, and eggs as high, or higher, than before. Large corporate organizations have the ability to extract larger profit margins from the marketplace for the benefit of their investors rather than pass cost savings on to consumers. Corporate contractors in the U.S. discovered this ability during consolidation of the poultry industry. They later duplicated the same basic process for beef and pork production and almost certainly will implement the same basic strategy in dairy.

This is the same basic strategy used by industrial corporations in all sectors of the global economy. Higher prices to consumers and lower prices to basic producers are the inevitable consequences of the corporate-consolidated, hierarchically-controlled, industrial structure of CAFOs. CAFOs are designed to benefit corporate investors not rural communities, not farmers, and not consumers. The economic promises of CAFOs are empty. Their economic consequences are inevitable.

Ecological/Public Health Consequences of CAFOs

The opponents of CAFOs typically voice their opposition to CAFOs in terms of negative impacts on the local environment. Noxious odors typically are the most immediately obvious and most offensive of the negative environmental impacts. Neighbors complain that they are deprived of the peaceful enjoyment of their property because they are unable to open their windows or engage in outdoor recreational activities due to odors from nearby CAFOs. Complaints of coughing and respiratory problems also are common. After CAFO opponents become better informed, they learn that CAFOs are also a well-documented major source of water pollution. Neighbors of CAFOs then fear they will not be able to use their private wells for drinking water. Community leaders become concerned about the need to add costly filters or chemical treatments to purify municipal water supplies drawn from local streams.

Proponents respond with claims that odors from CAFOs can be controlled, if not eliminated, through good management practices. They claim that while odors from CAFOs may be an occasional nuisance, they are no different from other agricultural operations which by nature emit dust particles and a variety of odors into the air. Proponents characterize those who complain about CAFO odors as "outsiders" who have moved to the country and just don't understand the necessary ways and means of farming and farm life. Those who claim that CAFO odors are threatening their physical and emotional health are labeled as being overly-emotional or psychosomatic.

CAFO proponents claim that documented cases of contamination of streams and groundwater with animal wastes represent relatively rare instances of irresponsible management a "few bad actors" who give responsible operators a bad reputation. They claim CAFO operators who follow "generally accepted management practices" represent less risk to the natural environment than do independent animal producers. They focus their claim on the "few bad actors" among independent producers who allow their livestock to have free access to streams. They also point out that most large CAFOs are regulated and monitored by government agencies; they must locate specific distances from streams and residential wells and provide detailed plans for spreading or disposing of animal manure. Those who are concerned about water pollution are labeled as radical, idealistic, environmentalists who just don't understand modern agriculture.

However, the environmental facts are quite different from the claims of CAFO proponents. Newer residents do tend to be less reluctant to lead the opposition to CAFOs because they don't have as many social ties with the few who might benefit economically from CAFOs. Many of those who oppose CAFOs are families who have been on the

same farms for generations; they are familiar with the dust and odors associated with farming. They know that CAFOs are not *real* farms; they are animal factories.

Air Pollution: The growing health concerns about odors from CAFOs are well-founded. The anaerobic process by which animal manure decomposes in the large manure pits and cess pools associated with CAFOs are quite different from aerobic decomposition of manure in open fields. The chemical compounds associated with noxious odors from CAFOs include ammonia, nitrous oxide, hydrogen sulphide, and other volatile organic chemicals. All of these have the potential to create health problems in humans. Numerous scientific studies by reputable health institutions in the U.S. identified in the studies previously referenced have linked air pollution from CAFOs to a variety of respiratory ailments in people living near CAFOs. Complaints of coughing and respiratory problems also are common. Odors, such as those in CAFOs, can be particularly detrimental to the health of children in the local community and in schools located near CAFOs. The link between noxious odors and health problems for those who work in CAFOs can no longer be denied.

CAFO proponents respond with claims that odors can be controlled, if not eliminated, through good management practices. They claim that while odors from CAFOs may be an occasional nuisance, they are no different from other agricultural operations which by nature emit dust particles and a variety of odors into the air. CAFO operators often promise to employ various strategies to mitigate odors and the associated health risks. While some of these strategies have been shown to be effective for some operations some of the time, odors have been a persistent and as yet unresolved problem for CAFOs in the U.S. New technologies to control odors is have been promised for decades, but have yet to accepted as economically feasible.

Water Pollution: With respect to water pollution, the U.S. Environmental Protection Agency has found that wastes generated by large-scale conventional hog, chicken, and cattle operations has polluted over 35,000 miles of river and has contaminated groundwater in 17 states in the U.S.^[11] If this is a result of irresponsible management, then irresponsible management obviously is widespread and ongoing among CAFO operators. The pollutants originating from CAFOs include nitrogen, phosphorus, antibiotics, pesticides, and heavy metals. Municipalities along these streams have been forced to add costly waste treatment facilities to mitigate the effects of CAFOs on their drinking water.

Massive dead zones have been created in the Gulf of Mexico, Chesapeake Bay, and elsewhere by CAFOs and the large-scale, chemical-intensive, industrial corn and soybean operations that provide their feeds. These consequences are not the result of a few bad actors; these are characteristic of an *under-regulated* industry. The environmental regulation of CAFOs has been far less stringent, and far less effective, than for other industries in the U.S. because CAFO supporters have been able to convince lawmakers that CAFOs are agricultural, not industrial, operations. Farming is exempted from many environmental regulations.

The negative impacts on water quality are a consequence of the basic structure of CAFOs. The manure from too many animals is concentrated in areas that are too small to assimilate the wastes. A general rule of thumb in the U.S. dairy industry is that about three acres of cropland are required to produce the feed for one dairy cow in confinement. A typical manure management plan might allow manure from a CAFO to be spread on only one or two acres per milk cow. Some fraction of the nutrient materials in feedstuffs would leave the dairy as milk and volatilized, but this could leave twice or three times as much chemical and biological materials in the manure as could be absorbed by growing crops. The excess will either end up in streams or groundwater.

CAFO operators have an economic incentive to flush as much excess nitrogen or phosphorus as possible into the environment. They need to keep levels in the soil with soil tests limits defined in CAFO regulations, while disposing of as much manure as possible. When manure is over-applied in this way, potentially useful nutrients, such as nitrogen and phosphorus, become pollutants, and the ability of natural ecosystems to neutralize the harmful elements is exceeded. Excessive nitrogen and phosphorus, along with residual antibiotics, pesticides, and heavy metals are flushed into streams and leached into groundwater. Thousands of miles of streams in the U.S. have been polluted by CAFOs following approved manure management plans.

In response to proposals of a new CAFO in an area, local residents may reason that a single CAFO will not significantly impact water quality for a community as a whole. However, the establishment of one CAFO in an area often results in the establishment of additional CAFOs in the same general area. This is the process by which streams and groundwater have been polluted by CAFOs in the U.S. with the resulting public costs and concerns for protecting public health. In general, the risks of one CAFO cannot be separated from the risks of CAFOs that may follow. Communities all across the continent have been forced to bear the health risks associated with CAFOs because they couldn't keep the first CAFO out of their community.

Public Health Risks of CAFOs: Virtually all of the environmental concerns associated with CAFOs are actually public health concerns. The notable exceptions may be the significant contribution of CAFOs to greenhouse gasses associated with climate change and impacts of dead-zones on oceanic fisheries. The chemical and biological contamination of air and water by CAFOs has resulted in numerous illnesses and even death among those who live downwind or downstream. CAFOs are natural breeding grounds for pathogens. The centralized mass-distribution systems of today's industrial food systems accelerate wide-spread dispersion of pathogens originating in CAFOs, causing wide-spread illness before epidemics can be identified and recalls implemented. Massive recalls of contaminated foods have become almost commonplace in the U.S. One such recall involved billions of eggs as a result of contamination with salmonella. A deadly version of the common E. coli bacteria, E-Coli 0157:H7, has evolved as a result of feeding high-energy grain rations to animals in CAFOs. This E. coli pathogen has caused illness and death and has resulted in a number of nationwide food recalls in the U.S. These and other organisms originating in CAFOs, including campylobacter and cryptosporidium, contribute to illnesses in millions of

Americans each year. Problems arising from these bacteria have accelerated in the U.S., mirroring the acceleration in construction of CAFOs.

Perhaps most significant among the public health risks associated with CAFOs is the dramatic increase in instances of antibiotic resistant bacteria, such as multidrug-resistant *Staphylococcus aureus* or MRSA. When bacteria become resistant to multiple antibiotics, medical doctors are left with few, if any, alternatives for treating specific infectious diseases. CAFOs provide ideal breeding grounds for antibiotic resistant bacteria. CAFO operators routinely give sub-therapeutic or small doses of antibiotics to animals to make them grow faster and prevent disease outbreaks among the animals. Without antibiotics, the extreme crowding and other unavoidable stresses in CAFOs would result in massive death losses. The sub-therapeutic doses are not sufficient to kill all members of a given strain of bacteria, which allows the most resistant organisms to multiply and eventually represent the dominant characteristic of the strain.

An estimated 70 percent of antibiotics and related drugs produced in the United States are used in animal agriculture for non-therapeutic purposes. This is more than eight times the estimated amount of drugs used to treat human illness. Many of the antibiotics used in CAFOs are the same antibiotics used to treat diseases in humans. Numerous U.S. studies have documented that use of antibiotics in CAFOs has contributed to the development of antibiotic resistance in disease-causing pathogens. The result has been fewer effective antibiotics for medical doctors to use against human diseases. Animal scientists in the U.S. have known about the health risks associated with routine use of antibiotics for at least 30 years. They haven't addressed the problem because doing so would reduce the economic efficiency of CAFOs, which are motivated by profits, not public health.

The Tobacco Defense: The only defense CAFO proponents have been able to provide when confronted with reams of research reports linking environmental pollution and human health risks to CAFOs is a lack of scientific consensus or definite proof. Admittedly, there are studies by scientists at reputable institutions that claim that the current body of evidence is inconclusive. None of these studies exonerate CAFOs of the accusations; they just conclude that more research is needed to provide conclusive proof, research their institutions could have done but have been unwilling to do. Invariably, the institutions represented by such scientists are promoters of CAFOs with strong financial or political ties to the corporations that benefit from CAFOs. In cases related to public health, public policies are typically based on the *precautionary principle*: If an action or policy has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus that the action or policy is harmful, the burden of proof that it is *not* harmful falls on those taking the action. In the case of CAFOs, the operators of CAFOs would be required to prove that CAFOs pose no significant risk to public health, rather than opponents of CAFOs being required to prove CAFOs are a threat to public health.

The CAFO/health issue today is very similar to earlier times when the tobacco corporations, and the institutions they funded or influenced, claimed there was no scientific consensus or definite proof linking tobacco smoking to human health risks.

They called for more research, which the institutions supported by the tobacco corporations had been unwilling to conduct. The biological-environmental systems from which environmentally-related human health risks arise are incredibly complex, even more so for health risks associated with CAFOs than with tobacco. Specific cause and effect relationships are difficult to isolate and replicate in controlled experiments. As was the case with tobacco, the overwhelming preponderance of scientific evidence today confirms the link between CAFOs and significant risks to public health. Many lives were likely lost by failing to apply the precautionary principle to tobacco. Policy makers should not make the same mistake for CAFOs.

More research might be useful, but more research is not necessary. These negative ecological and public health consequences of CAFOs are inherent in their specialized, standardized, consolidated, industrial structure. CAFOs gain their economic efficiencies by consolidating or concentrating large numbers of animals in specialized, standardized, animal factories. A whole host of negative ecological and environmental consequences are the inevitable result of concentrating the production of too many animals in spaces that are too small to accommodate the basic health needs of animals and to assimilate or neutralize their inevitable wastes. The production processes in industrial organizations are linear, sequential, input-output systems by their very nature. Specific raw materials provide the necessary inputs to industrial production processes. The inputs are transformed into products, by-products, and wastes. The useful materials are retained in the products and by-products and the waste materials being left for disposal. In CAFO operations, feeder animals, feeds, and medications are the basic inputs. As feed is digested by the animals, the useful materials are transformed into meat, milk, and eggs; the waste materials are excreted as animal manure left for disposal.

Social Consequences of CAFOs

The only things proponents and opponents of CAFOs seem to agree about are that CAFOs disrupt the social life of rural communities and raise controversies within society as a whole. The controversies surrounding CAFOs frequently pit neighbors against neighbors and local officials against their constituents. Such conflicts invariably strain social relationships and often rip the social fabric of rural communities. This is perhaps the most damaging and longest-lasting impact of CAFOs on the overall quality of life in rural communities. CAFOs impact the quality of life in rural communities in three main ways: they disrupt rural lifestyles, increase economic disparity, and deny democratic rights of rural people.

The odors associated with CAFOs do more than create health risks for neighbors. Studies have confirmed the loss of freedom and independence associated with being able to freely go in and out of doors results in feelings of violation, isolation, and infringement. Backyard barbecues and visits with friends and family at farm homes always risk being disrupted by odors. Social gatherings and church attendance in rural areas also may be affected by odors, but are even more affected by members of churches and social organizations who end up on different sides of the CAFO controversy. All of these disruptions of routine destroy the common sense of belonging and identity that is typically associated with ways of life or lifestyles in rural communities.

The basic industrial nature of CAFOs seems to violate a rural ethic or shared sense of social and economic equity and justice. Rural people, like people elsewhere, may be a bit jealous of neighbors who advance economically while others in the community continue to struggle for economic survival. However, individual economic success is generally accepted, if not applauded, as long as those who succeed do not do so at the expense of their neighbours or the community as a whole. Such is not the case with CAFOs. Operators of CAFOs are motivated by the prospect for profits, not by neighborliness or community interests. The establishment of a CAFO almost always leads to decreases in property values for neighbors, and if accompanied by a number of CAFOs, can threaten the economic future of the community as a whole. Even though most of the profits go to outside corporate investors, local CAFO owners may reap significant short-run economic benefits. These local investors are seen as benefitting at the expense of their neighbours and the community. This leads to social animosity as well as economic instability in the community. A large number of studies have documented increased social and economic inequity in areas where CAFOs locate.

In addition, rural residents who are concerned about CAFOs often find that they have no protection and almost no rights under existing laws. Recognizing the inadequacies of existing CAFO regulations, opponents frequently turn to locally-elected officials and administrators for help. In some cases, CAFO corporations and local investors find legal ways to bribe local politicians to ensure that local government decisions favour their interests, and not the interests of the community. In other cases, efforts to enact county and municipal regulations have been countered by attempts to remove any ability to regulate air and water pollution from the counties or municipalities. This leaves the authority to regulate CAFOs to state and national governments where large agribusiness corporations can more easily exert their economic and political influence. This effectively removes citizens' abilities to provide input and shape decisions affecting regulation, or lack of regulation, of CAFOs in their communities. As a result, people in many rural communities no longer have a right to protect their health and physical well-being against the public health threat represented by CAFOs. A long-standing democratic right of citizenship is thus systematically denied.

Some local political leaders are more than willing to defer to state and federal governments. They can then blame inadequate regulations of CAFOs on state and federal authorities rather than accept their responsibility to do so locally. Others may feel trapped in a struggle between demands of local citizens for local control and their inability, under existing law, to enact adequate local regulations. The basic denial of rights of local control of both citizens and elected officials leads to political deskilling in rural communities meaning people lose their ability to articulate a position, listen, strategize, research, find a consensus, depersonalize conflict, and build external alliances. When confronted by the inevitable controversies surrounding CAFOs, many rural communities lose their ability to function as a civil community.

Animal Welfare Consequences of CAFOs

The general public or societal concerns about CAFOs have been associated primarily with the inhumane treatment of animals in CAFOs, and more recently, concerns about the growing health risks of antibiotic resistance. Both of these concerns are inherent in the basic industrial nature of CAFO operations. Major anti-CAFO political initiatives have been mounted in the U.S. by animal protection organizations, including the Humane Society of the United States and the Farm Sanctuary organization. While the initial steps have focused on providing more space for animals in confinement systems, the humane treatment of farm animals eventually will require the elimination of CAFOs. There is simply no way that thousands of livestock or hundreds of thousands of poultry can be treated humanely while in confinement facilities. Farm animals did not evolve to live in confinement any more so than humans evolved to live in prisons. There is simply no opportunity to afford farm animals the dignity and respect that must precede humane treatment when they are confined in large-scale concentrated feeding operations. Animals are sentient, feeling, living organisms or beings, not inanimate mechanisms. Real farmers treat animals with dignity and respect even when they are used for human food.

Extensive references to studies documenting the inevitable mistreatment of animals in CAFOs can be found in a comprehensive Canadian study sponsored by the World Society for the Protection of Animals.^[12] Modern intensive production practices were first criticized on animal welfare grounds in the 1960s based on the intensiveness and degree of confinement in production facilities that today we call CAFOs. Research in the subsequent 50 years has shown that these criticisms were well-founded; intensive production systems and severe confinement invariably leads to greatly reduced welfare. The mistreatment of animals in CAFOs is not only a result of overcrowding, but also includes painful invasive procedures, transportation and pre-slaughter handling, and genetic selection for maximum production.

The Canadian study reminds us that the advent of CAFOs in the 20th century brought about the most significant changes in the 10,000 year history of animal agriculture with respect to the treatment of farm animals. Many traditional *extensive, pasture-based* agricultural systems were replaced by *intensive, confinement industrialized* systems of animal production. Traditional animal agriculture was rooted in animal husbandry; meaning animals were kept in optimal environment for which they were biologically suited. Animal husbandry was about caring for animals in ways that enhanced their ability to survive and thrive under the varying conditions of nature. The primary incentive for good animal husbandry was self-interest the producer did well if and only if the animals did well. Mistreatment of animals or violation of their basic nature decreased productivity, profits, and the economic well-being of the farmer.

When I was a college undergraduate, students took courses in animal husbandry. However, *animal science* later replaced animal husbandry on college campuses and on farms. Animal science focused on new technologies that considered animals as little more than biological machines in industrial animal factories that today are called CAFOs. Industrial livestock production systems perverted the economic incentive for animal husbandry by actually creating economic incentives for the mistreatment of farm animals. It was no longer necessary to respect the basic nature of animals by mimicking

natural habitats. The economic efficiency demands that animals be kept in environments suited for economic well-being of investors rather than physical well-being of animals. Even though animal illness is chronic and animal death losses are far higher than in more humane environments, the economic efficiencies of large-scale, concentrated, industrial production still assure production and profitability.

CAFO proponents claim that animals must be healthy if they are to gain weight or be otherwise productive. The positive correlation between overweight people, including children, and chronic illnesses clearly invalidates such claims. Modern agriculture relies on technologies such as antibiotics, vaccines, and regulated ventilation systems to keep disease risks and poor air quality at economically acceptable levels. In CAFOs, sick and dying animals are undesirable but necessary economic costs of doing business in an industrial production system. Animal factories strive to send animals to slaughter at young ages, before chronic illness results in death. For example, the natural lifespan of a chicken is 7 to 20 years. A broiler chicken is sent to slaughter at 6 to 8 weeks and laying hens at around 18 months. The average lifespan of a dairy cow in a CAFO is only 4 to 5 years, about one-third as long as milk cows on traditional family dairy farms. The physical and mental welfare of sick and dying animals is given no consideration other than the impact on the economic bottom line.

Socially Responsible/Sustainable Alternatives to CAFOs

Some advocates of CAFOs, including some CAFO operators, concede that CAFOs are detrimental to the future of rural communities and society ^① environmentally, socially, and even economically. However, they quickly counter that there are simply no viable alternatives. We cannot go back to the diversified, family farms of the 1950s, because we can't allow large numbers of people to starve. Even if we have to sacrifice the natural environment, rural communities, and some long-held social and ethical values people will have to eat, they say. Agricultural producers may even have to learn to live with less economically in the new agricultural economy. Corporations are here to stay and so is corporate agriculture. There is simply no alternative to CAFOs, other than to abandon animal agriculture, and that would deny people a vital source of high-quality protein ^② so the proponents claim.

Again, reality is quite different from the claims of CAFO proponents. A wide range of new farming opportunities are emerging in response to growing concerns for food safety, environmental issues, and social concerns. These are dismissed by industrial agriculture as small niche markets that hold promise for only a few, small, specialty farmers. In reality, however, these new markets for ^③sustainably produced foods^④ are creating an opportunity to recreate the entire food system, including agriculture. A growing number of consumers are willing to pay premium prices for foods they know are safe and wholesome and also have ecological and social integrity. For example, the market for organic foods has been the fastest growing segment of the U.S. food system for more than two decades. This growing preference for organic is not simply a reflection of consumers trying to avoid pesticide and agricultural residues in their foods. Consumers are concerned also about residues of growth hormones and antibiotics, E-Coli and Salmonella, and a wide range of social and ethical issues associated with CAFOs.

They are concerned about the economic and social consequences of their food choices for farmers, farm workers and for stewardship of land and water resources.

Recent surveys indicate that around three-fourths of U.S. consumers have a strong preference for locally grown foods preferably grown on small family farms. They want to know where their food comes from, how it is produced, and who produced it. Many Americans have simply lost confidence in the integrity of the corporations and government agencies with whom the integrity of the food system has been entrusted. CAFOs epitomize the kind of agriculture that consumers most distrust. Increasingly, Americans are buying as much of their food as possible from people they know and trust in their own communities.

In sustainable farming operations, feed and feeder animals are produced on the same farms or neighboring farms, which allows the nutrients left in animal wastes to be returned to the fields where the feed and feeder animals are grown. In this way, the natural ecosystems associated with farmland, above and below the surface of the soil, are able to recycle the useful nutrients contained in manure back into crops, assimilating and neutralizing any harmful wastes in the process. Authentic agriculture is fundamentally different from industrial processes; it is renewing and regenerative, rather than linear and sequential.

Sustainable farming is different from CAFOs also in that farm animals have space to move about in well-ventilated buildings and freedom to roam outdoors in fresh air and sunlight. The odors on real farms are diluted by the dispersion of animals and the detectable odors arise from aerobic rather than anaerobic decomposition processes. Real farms smell like farms, not biological factories. In authentic agricultural operations, the animals are healthy, not sick, and don't require the routine use of antibiotics. Animals are treated when they are sick to restore health, rather than to keep them alive and promote growth. Medications are not production inputs; they are means of dealing with emergencies. CAFOs are not farms; they are factories.

Among the most profitable of the new sustainable/local alternatives are grass-based, free-range, and pastured livestock and poultry alternatives to CAFOs. Pastured and free-range poultry production became popular because of growing concerns about health and food safety and about inhumane growing conditions in industrial poultry production. Grass-based livestock operations initially gained popularity because of low investment requirements and low cost of production. However, it has become increasingly popular because of growing evidence of important health benefits in grass-fed products compared with products from animals fed in confinement. Pastured and free-range livestock production also allows producers to avoid hormones and antibiotic concerns and to meet the humane standards of production demanded by an increasing number of consumers.

Producing hogs on deep-bedded facilities provides another viable alternative to the slatted floors, cramped crates, and manure lagoons and pits associated with CAFOs. Studies at major agricultural colleges in the U.S. have shown that hogs can be produced in deep-bedded hoop-houses just as efficiently as in CAFOs; they just require better

management, which means employing more intelligent, thoughtful, caring hog farmers. Studies at various universities have shown grass-based dairy farms to be more profitable than confinement dairy operations, in fact, among the most profitable of all farming operations. When farmers take the initiative to process and market their own meat, milk, and cheese directly to discriminating consumers, their profits are often multiplied.

The state of Wisconsin historically has been known as the "Dairy State." It lost its status as the number-one producer of dairy products with the advent of dairy CAFOs in California. Today, the traditional economic and social quality of life in rural Wisconsin is being threatened by pressures for the agricultural industrialists in Wisconsin to encourage dairy CAFOs in Wisconsin. A recent paper prepared by the Grazing and Organic Specialist at the Wisconsin Department of Agriculture stated that 400 CAFOs, averaging 3,000 cows each, could produce the milk currently produced by more than 12,000 independent Wisconsin dairy farmers.^[13]

The following quotations from this unpublished paper are provided with the permission of the authors: "This is a good time to focus on this bigger, longer-term picture of Wisconsin dairy." We can start a statewide dialogue on the "triple bottom line" implications of the choices before us. Today, about 25% of dairy farms are pasture-based and approximately 10% are large herd confinement farms. There are many challenges facing the other 65% of dairy farms in Wisconsin. If recent history is any indication, we are likely to lose many of them. Managed grazing and other efficiencies may be a good fit for these small scale dairymen, who for any number of reasons, may not want to choose the expansion [CAFO] alternative. Here are just a few:

Environment: Distribution of cattle farms across Wisconsin's landscape provides a significant environmental benefit to the state. Much of our arable land is highly erodible and inclusion of perennial pastures and hay in crop rotations makes it possible for farmers to meet environmental standards. Many acres of farmland not suitable for annual cropping can be pastured successfully. All of these acres of perennial forages provide high quality habitat for ground nesting birds and other grassland dependent species.

Rural communities: On average, each dairy cow in Wisconsin represents about \$17,000 in economic activity in the community where the farm is located^[14]. The concentration of milk production among fewer, larger farms limits the impact of this activity to fewer communities. This effect is compounded by the fact that larger farms are more likely to purchase inputs in large quantities from out of state, while smaller farms tend to make more purchases in their local communities. Small scale dairy plants are also a good source of jobs and economic activity for rural communities. This value is also reflected in higher average milk prices received by farmers shipping to small Wisconsin plants compared to larger national dairy manufacturers in other states. Larger numbers of moderate-sized dairy farms in close proximity to small dairy processors can support the continued economic viability of Wisconsin's rural communities.

Economics: The average farm in Wisconsin is about 200 acres in size. Other than vegetable and other specialty crops, no other production system has the potential to return

as much profit per acre as dairy. A profitable cash grain farm must be much larger—probably 500 to 1000 acres. The profitability of dairy farms is dependent on many factors. UW Center for Profitability data suggests that, contrary to popular belief, maximum efficiency on a per-cow basis is gained in the 150 to 200 cow range. Management system is a factor as well. Well-managed pasture-based dairy farms have consistently out-performed traditional confinement and large herd confinement farms on a per-cow and a per-cwt basis^[15]. Nearly half of beginning dairy farmers are getting their start using managed grazing. The reduced capital investment and reduced cost of production make this a logical means to start on a sound financial footing and stay there over the long term.

Managed grazing systems are logical, economically viable alternatives to dairy CAFOs. At least some well-educated, enlightened people in the dairy state of the U.S. are relying on scientific research and common sense to make the case for alternatives to CAFOs. Similar cases could be made for alternative systems for producing beef cattle, hogs, and poultry. CAFOs are not the future of animal agriculture. Agriculture was the last major sector of the U.S. economy to be industrialized because a farm is a renewing, regenerative, biological system—not an inanimate mechanism. Therefore, the industrial era in agriculture will be shorter than in any other sector of the economy. The era of CAFOs will be short-lived; they are not ecologically, socially, or economically sustainable. They will be replaced by viable alternative, sustainable agricultural systems.

Regulation of CAFOs

In the meantime, CAFOs must be regulated as any other industrial operation; not as farms. CAFOs should comply with the same requirements regarding emissions of chemical wastes and byproducts and for the health and safety of animals as well as workers as other manufacturing operations. Air emission standards for CAFOs should be established at levels to ensure the protection of human health. Animals are workers in these agriculture factories and should be treated with dignity and respect, even if they are destined to be used for food.

With regard to biological wastes, animal wastes should be regulated much as human wastes are regulated, as is necessary to protect public health. In cases of farm residences and rural residential developments with significant acreages per household, where the density of human populations is low, properly constructed and maintained lagoons or septic tanks are adequate to protect the general public from health risks associated with human wastes. In more densely populated residential developments, such as apartments and other multifamily rural developments, collective or community waste treatment facilities are required to mitigate the greater risks associated with higher concentrations of human wastes. Residential densities associated with villages, towns, and cities logically require full-scale, multi-stage municipal waste treatment facilities of increasing sophistication to accommodate the greater health risks associated with large concentrations of human wastes.

CAFO waste treatment regulations should reflect the same basic logic and principles as municipal waste treatment regulations, with appropriate adjustments for differences in

health risks associated with human and animal wastes. Smaller non-confinement and solid-waste confinement operations should be allowed to manage their wastes without significant regulation or supervision, as long as their wastes do not contaminate public streams or trespass on their neighbors' properties. Larger solid-waste systems and all liquid-waste confinement systems should be regulated much as large CAFOs are currently regulated, with specific facilities requirements and manure management plans. Any confinement animal feeding operation over a specific size, for example 250 animal units, should be treated as an animal *municipality*, rather than a farming operation. Such operations should be required to have full-scale, multi-stage waste treatment facilities as deemed appropriate to protect public health.

Estimates may vary depending on specific circumstances, but it only takes about 20 dairy cows, 60 beef feeder cattle, 280 feeder pigs, 6,200 laying hens, or 11,000 broiler chickens to produce as much *total solids of biological wastes* as 1,000 humans.^[16] In other words 200 dairy cows, 600 feeder cattle, or 2,800 feeder pigs produce as much biological wastes as a town of 10,000 people. It only takes 50 dairy cows, 100 beef feeder cattle, 310 feeder pigs, of 9,400 laying hens to have the same BOD effect, or biological oxygen demand, as 1,000 humans. Similar relationships exist between animal wastes and human wastes for total nitrogen and total phosphorus contents.

With regard to total coliform or infectious bacteria, 1,000 humans produce about the same amount of bacteria as 30 dairy cows, 1,300 beef feeder cattle, 10,000 feeder pigs, and 130,000 laying hens. So, it takes more feeder cattle, feeder pigs, and chickens than humans to produce the same amount of coliform bacteria. However, animal wastes is far more concentrated than household human waste. Dairy waste is 3.3 times as concentrated as human waste, beef waste 11 times as concentrated, pig waste 39 times as concentrated, and poultry waste from 1,000 to 3,000 times as concentrated as human waste. So, animal waste can quite logically be thought of as a form of toxic waste. Although the transformation from animal health risks to human health risks obviously vary by species and health risk, the wastes from a 250 animal unit CAFO would seem to result in human health risks roughly equivalent to 10,000 people. If this conclusion is even close to accurate, full-scale, multi-stage waste treatment facilities should be required for CAFOs of 250 animal units and larger.

A typical dairy CAFO, 1,000 head for example, would generate as much of the following specific waste products for municipalities of the following sizes:

- Total Solids: 50,000 1,000 cow dairy CAFO = 50,000 person municipality
- Bio Oxygen Demand: 20,000 1,000 cow dairy CAFO = 20,000 person municipality
- Total Nitrogen: 25,000 1,000 cow dairy CAFO = 25,000 person municipality
- Total Phosphorus: 33,333 1,000 cow dairy CAFO = 33,333 person municipality
- Total Coliform Bacteria: 33,333 1,000 cow dairy CAFO = 33,333 person municipality

Regulations that allow the wastes from a 1,000 cow dairy CAFO to be stored in pits or open storage ponds and spread on surrounding farms are simply not adequate to protect public health. Similar calculations can be made and similar conclusions can be derived for any species of livestock or poultry operations of sizes typically defined as CAFOs in the U.S.: 1,000 animal units. The public health risks of CAFOs are inherent in the industrial paradigm or model by which they function. They are profit driven operations that rely on specialization, standardization, and consolidation of control for their economic efficiency. Much of their efficiency, as with other industrial operations, is derived from their ability to impose many of their ecological and social costs on their neighbors and on society in general. Real farmers, being real people, are reluctant to benefit at the expense of their neighbors and society. The publicly-traded corporations that control most CAFOs, since they are not real people, do whatever is necessary to maximize profits for their investors, if they are not adequately regulated by real people by society. Their investors have no values in common other than the desire to increase the value of their investments.

If current CAFO regulations were adequate to protect public health, and were adequately enforced, any economic disadvantage for small livestock and poultry producers would be removed. The current economic advantage for CAFOs in the U.S. results in large part from lax environmental and public health regulations. Regulations remain lax because the corporations that control CAFOs have the economic and political power to prevent effective regulation. If smaller livestock and poultry operations could not compete under conditions that protect public health and the environment, it would be logical to conclude that the public is actually benefitting economically from the dominance of CAFOs in animal agriculture. As long as regulations allow CAFOs to impose significant public health and environmental risks on the rest of society, there is no way of knowing whether corporately-controlled CAFO operations are actually more or less economically efficient than smaller, independent livestock and poultry operations.

Critical Choices for Rural Communities

Many rural communities today are being forced to sacrifice their future so a few local investors and outside corporate investors can benefit economically from large-scale, confinement animal feeding operations. The most valuable assets many of these rural communities possess are their natural environment and their strong sense of community the rural quality of life. Rural communities are still viewed by many people as good places to live and raise families. Most are still places with clean air, clean water, open spaces, scenic landscapes, and opportunities for peace, quiet, and privacy. Most are still places where people have a sense of belonging, friendly places where people know and care about each other, where crime rates are low and a strong sense of safety and security still exists. Such attributes are becoming increasingly scarce in the United States, and thus are becoming increasingly valuable. It would take a six-figure salary for a city dweller to buy the quality of life that comes with living in a healthy rural community. Some aspects of rural life are truly priceless. These precious quality of life attributes represent the future of rural areas, and they may all be lost when a community becomes known as a CAFO community.

As rural areas become polluted and degraded by exploitation, rural communities are losing their most precious rural resource, the next generation; as their children leave home for the cities, where they have better opportunities. In fact, rural parents in the U.S. routinely advise their children to go away to college and get a good education so they won't have to return to the rural community or depend on agriculture for a living. Increasingly, rural people are realizing there is no future in turning their communities into dumping grounds for the rest of society — not just for CAFOs, but also for landfills, toxic waste incinerators, and prisons. They just don't know what else to do. They have been systematically abused for so long they have come to accept the degradation as inevitable. By one means or another, rural people must reclaim their right to a healthy and clean environment. Then, they can begin the task of rebuilding an economic, social, and ecological foundation needed for sustainable economic development of their communities. CAFOs are not inevitable; there are viable alternatives. The future of rural communities is in the land and the imagination, creativity, work ethic, and honesty of the people of rural communities, not in the cunning and conniving of the outside corporate investors who control CAFOs.

Now is the time to reclaim the rural environment from corporate agriculture. Now is the time for rural people to invest their time, their energy, their intellect, their money, and their integrity in restoring the health and productivity of their land and their environment. The people of rural communities simply cannot afford to wait until regulators are overwhelmed with mountains of scientific evidence documenting the negative effects of CAFOs. There are inevitable economic, social, ecological, and human health effects inherent in the industrial organizational structure of CAFOs. They are designed and operated to maximize profits not minimize or even mitigate ecological, social, or human health risks. Now is the time to take individual actions and to demand action of those in positions of public responsibility, before it is too late.

End Notes

^[1] Prepared as background information for various public presentations in Lower Leighton, Wales, UK, sponsored by the World Society for Animal Protection, March 4-8, 2013.

^[2] John Ikerd is Professor Emeritus, University of Missouri, Columbia, MO USA; Author of, *Sustainable Capitalism*, and *Essentials of Economic Sustainability*, <http://www.kpbooks.com>, *A Return to Common Sense*, <http://Amazon.com>, *Small Farms are Real Farms*, Acres USA, <http://www.acresusa.com/other/contact.htm>, *Crisis and Opportunity in American Agriculture*, University of Nebraska Press <http://nebraskapress.unl.edu>; and *A Revolution of the Middle and the Pursuit of Happiness*, online: <http://sites.google.com/site/revolutionofthemiddle/>.
Email: JEIkerd@gmail.com; Website: <http://web.missouri.edu/~ikerdj/> or <http://www.johnikerd.com>.

^[1] Kendall Thu and E.Paul Durrenberger, *Pigs, Profits, and Rural Communities*, (Albany, NY: State University of New York Press) 1998.

^[2] Curtis Stofferahn, *Industrialized Farming and Its Relationship to Community Well-Being: an Update of the 2000 Report by Linda Labao*, special report prepared for the North Dakota, Office of Attorney General, <http://www.und.edu/org/ndrural/Lobao%20&%20Stofferahn.pdf>.

- ^[13] Johns Hopkins Bloomberg School of Public Health, Agriculture and Public Health Gateway, Industrial Food Animal Production, <http://aphg.jhsph.edu/?event=browse.subject&subjectID=43>
- ^[14] U.S. Government Accounting Office Report 04-490, April 2004 Antibiotic Resistance; Federal Agencies Need to Better Focus Efforts to Address Risk to Humans from Antibiotic Use in Animals, <http://www.gao.gov/new.items/d04490.pdf>
- ^[15] American Public Health Association, *Association News*, 2003 Policy Statements, <http://www.apha.org/legislative>.
- ^[16] Pew Commission on Industrial Farm Animal Production: Putting Meat on The Table: Industrial Farm Animal Production in America, http://www.pewtrusts.org/news_room_detail.aspx?id=38438 , full report, <http://www.ncifap.org/>
- ^[17] R-CALF USA. Comments on Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy. Comment to U.S. Department of Justice. December 31, 2009.
- ^[18] Nigel Key and William McBride, The Changing Economics of U.S. Hog Production, Economic Research Report No. (ERR-52) 45 pp, December 2007.
- ^[19] [Wisconsinwatch.org](http://wisconsinwatch.org), Immigrants now 40% of states dairy workforce, November, 2009. <http://wisconsinwatch.org/2009/11/4/immigrants-now-40-of-states-dairy-workforce/>
- ^[10] USDA Price Spreads from Farmer to Consumer, www.usda.ers.gov/data-products/price-spreads-from-farm-to-consumer.aspx
- ^[11] Global Action Network, How Factory Farms Pollute Air and Water, <http://www.gan.ca/lifestyle/vegetarian+guide/vegetarians+and+the+environment/how+factory+farm+ing+pollutes+water+and+soil.en.html> .
- ^[12] World Society for Protection of Animals, What's on Your Plate? The Hidden Costs of Industrial Animal Agriculture in Canada, 2012, <http://www.wspa.ca/food/default.aspx> .
- ^[13] Laura Paine, Grazing, Dick Cates, and Paul Dietmann, Saving 11,600 Wisconsin dairy farms, Wisconsin, Institute for Sustainable Agriculture, Special Report, College of Agricultural & Life Sciences, University of Wisconsin-Madison, 2012.
- ^[14] Steven Deller and David Williams, 2009. Economic impact of agriculture on Wisconsin Counties, <http://www.uwex.edu/ces/ag/wisag/>.
- ^[15] Tom Kriegl, 2000-2009. Production costs on selected Wisconsin grazing farms. Center for Dairy Profitability website: <http://cdp.wisc.edu/Great%20Lakes.htm> .
- ^[16] Ron Fleming and Marcy Ford, Human versus Animals - Comparison of Waste Properties, Ridgetown College - University of Guelph July 4, 2001, http://www.ridgetownc.uoguelph.ca/research/documents/fleming_huvsanim0107.PDF