

LEVELING THE FIELD – ISSUE BRIEF #2

Environmental and Health Problems in Livestock Production:

Pollution in the Food System

Over the last thirty years, the livestock production system in the United States has undergone an industrial revolution. The number of animals raised for meat has been steady or growing, even as the number of farms raising animals has declined. Today, we have only a quarter the number of hog farms we had in 1982, but the number of hogs sold has gone up. How is that possible? Only because of a major change in the way livestock are produced—a change that affects farmers, consumers, businesses, and our communities.

In the industrial model of livestock production, animals are housed in close quarters inside massive climate-controlled buildings or on feedlots. Each confined animal feeding operation, or CAFO, may house tens or even hundreds of thousands of animals. To prevent disease, many livestock companies require their growers to feed animals low doses of antibiotics. CAFOs store the waste these animals generate in massive lagoons on the property and sometimes spread or spray the manure on available land.

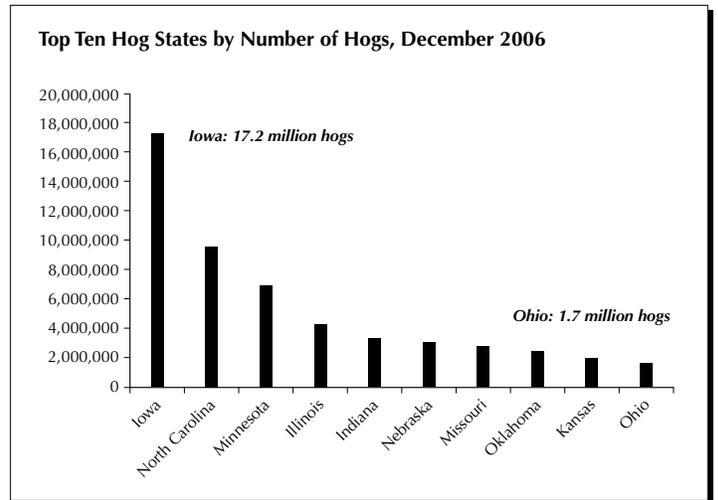
Even if you've never seen a CAFO, you can probably understand why many communities and researchers are worried about their impact on the environment and public health. Workers in confinement buildings and residents of the communities where these operations are located feel the impacts most acutely, but we are all affected by health and environmental problems in the food system. The vitality of our food system is dependent on healthy rural communities and a clean rural environment. If they're compromised by air pollution, water pollution, odor, or antibiotic resistance, then we all need to be concerned.

This issue brief is the second in a series that maps the impacts of industrial livestock production and outlines the creative, innovative responses of individuals, organizations and communities. We'll begin with a summary of major health and environmental concerns; then we'll look at what groups all across the country are doing to address them. We can learn from their experience and use the tools available to build a healthier, safer, and more vibrant food system.

When Manure Multiplies

In every way—within confinement barns and feedlots and within the communities and regions where animals are raised for meat—livestock production has become more concentrated. In the hog sector, the 110 largest operations, which each house over 50,000 animals, account for 55% of the national hog inventory.¹ In two North Carolina counties alone, the number of hogs has increased by 2 million since 1990, and the counties now average 2,185 hogs per square mile.² Three counties in northern Iowa experienced a nearly three-fold increase in the number of hogs between 1992 and 1997—from 600,000 to over 1.6 million—while the number of farms raising hogs declined by almost 40 percent.³

When CAFOs housing thousands of animals are geographically concentrated, their environmental and health impacts are concentrated too. Workers, area residents, and the communities located downstream or down-wind of the animals may find themselves with a lot of problems on their hands. The greatest environmental and health challenges are odor, air pollution, surface and ground water pollution, and antibiotic resistance. Let's take a look at these problems in more detail.



The top ten hog producing states housed a combined total of 52.6 million hogs in 2006. A high concentration of animals magnifies their impacts on health and the environment.

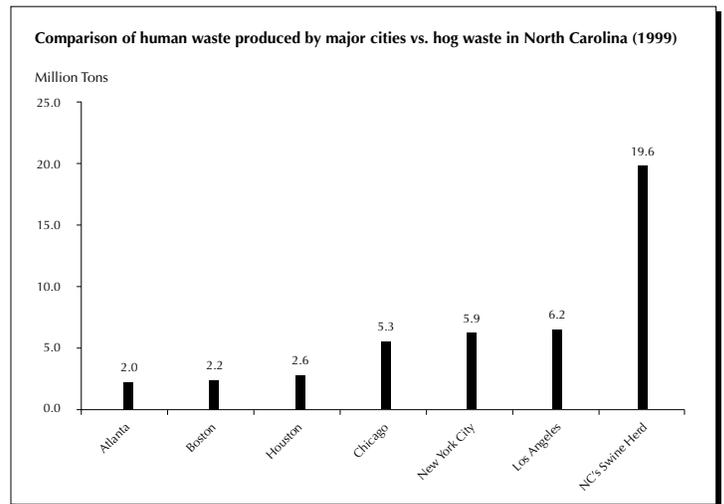
Source: USDA/NASS (2007)

Water Pollution from Manure

Animals generate waste. While many traditional crop and livestock operations use manure as a fertilizer, letting animals roam on land after harvest to build up organic matter,⁴ industrial operations have far too much waste (and far too little land) to use this method. Most industrial operations store waste in massive lagoons that can hold millions of gallons of liquid manure. They may spread or spray some of the manure on available land. When it is spread in excessive quantities, or when the lagoons leak, problems result.

Hog CAFOs are often cited as the most problematic with respect to waste storage and removal, but there are numerous examples of pollution problems originating in cattle feedlots, industrial dairies, and poultry operations.⁵ On Maryland's eastern shore, 6,000 broiler houses turn out 750,000 tons of chicken manure each year, more waste than is produced by a city of 4 million people.⁶ A state-wide study in California conducted by the Environmental Protection Agency estimates that each dairy cow produces almost 44,000 pounds of manure per year. California is now home to over 1.5 million dairy cows. Many of the operations are located in the San Joaquin Valley, which is struggling to deal with the manure problem and related pollution issues.⁷

Meanwhile, as visible in the chart below, hog CAFOs in North Carolina alone produce nearly 20 million tons of waste a year—more than the human residents of New York, Chicago, and Los Angeles combined.⁸



Cochran et al. (2000).

The careful management and removal of this amount of waste is crucial to preserving environmental and human health. Raw manure can contain up to 100 million fecal coliform bacteria per gram, as well as

ammonia, phosphorus, and other nutrients and microbes that can contaminate soil and water in high concentrations.⁹ E. Coli bacteria have been found in the manure of a quarter of the beef cattle on large feedlots.¹⁰ Unfortunately, evidence suggests that pollution problems from CAFO manure are large and spreading.

Nitrogen and phosphorus can aid plant growth when applied in reasonable amounts, but are dangerous in high concentrations. The EPA has identified poultry manure as the largest source of excess phosphorus and nitrogen in the Chesapeake Bay and found that the nutrients have created a dead zone as plants and aquatic life are smothered from lack of oxygen. One-third of all wells in Maryland's chicken-producing areas have been found to have concentrations of nitrate, which is created by the breakdown of nitrogen by microbes, that exceed EPA standards for drinking water.¹¹

Another study found that nitrates were responsible for contamination in 3/4 of all wells surveyed in central and western Kansas.¹² High nitrate concentrations in drinking water can cause blue baby syndrome and may contribute to developmental defects in fetuses or miscarriages in pregnant women.¹³

Manure gets into surface and ground water when lagoons spill or break, or when the CAFO operator spreads or sprays too much manure on the land around the operation.¹⁴ Spills and leaks occur quite frequently.¹⁵ In just one example, researchers at Kansas State University acknowledged that 87 million gallons of waste had leached into groundwater over the 15-year life of a large Kansas hog CAFO.¹⁶ Another study found that over half of Iowa's 5600 manure storage structures leaked at rates above the legal limit.¹⁷

Nitrogen and other pollution from CAFOs becomes an even greater public concern when the effects of manure contamination spread from the operation outward into the community and beyond. The EPA reported in 1998 that CAFOs were a contributing source of water pollution in 20% of impaired water sources in the United States.¹⁸

Manure contamination can spread in groundwater aquifers or on products washed with contaminated water. In an era of national and even global food distribution, we are all at risk when the rural environment is compromised.

Air Pollution from Waste

“Piling up too much ‘stuff’ in one place causes problems. If you spread out the animals and let manure lay where it falls in a pasture, it doesn’t bother anyone very much. But if you start collecting it, flushing it, spreading and spraying it around—all normal practices in confinement operations—it becomes air pollution.”

– Dr. John Ikerd, University of Missouri, 2001

Another method used by livestock production facilities to dispose of waste is the spray application of liquefied manure to fields surrounding the operation.

Spraying large amounts of manure sends dust particles into the air that can penetrate the lungs of humans nearby. The particles carry toxic gases such as ammonia, which can impede the lungs from clearing dust particles, and hydrogen sulfide, which can prevent cells from using oxygen and causes loss of consciousness, coma, or death at high exposure levels.¹⁹ One study found that residents living downwind from CAFOs emitting hydrogen sulfide at fairly low levels were suffering from permanent nervous system impairment.²⁰ Exposure to persistent,



Thousands of cows produce a lot of waste.

Photo courtesy factoryfarm.org

low levels of hydrogen sulfide can cause fatigue, short-term memory loss, headaches, and other symptoms.²¹ Air pollution from CAFOs is poorly

regulated under the federal Clean Air Act, so the harm to residents living near the facilities from air pollution goes largely unaddressed.²²

Risk to Workers, CAFO Owners and Their Families

Workers, CAFO owners, and their families face some of the greatest risks from livestock pollution.²³ Many spend their days inside these operations and are exposed regularly to dust, gases and odor.

Epidemiological studies have compared CAFO workers to workers involved in jobs that do not bring them in contact with livestock. The studies show significantly higher incidences of chronic bronchitis, asthma, flu-like symptoms, and lower respiratory tract inflammation in CAFO workers than in other workers. Ammonia, toxins, and dust are the biggest health threats. CAFO workers have been found to have higher incidences of infection

with and illness from salmonella, leptospirosis, and hepatitis E than non-CAFO workers.²⁴

The families of CAFO owners and the owners themselves are also at risk. One particularly horrific story retold by researcher Marlene Halverson involved five members of a CAFO-owning family who died from methane asphyxiation after entering a 10-foot deep liquid manure pit on their farm in Michigan. One family member had climbed down a ladder in the pit to make a repair, was overcome by fumes, and fell in. Four others followed him and perished as each tried to save the last.²⁵

When Animals Stop Smelling and Start Stinking

Much of the damage caused by livestock pollution is subtle. Community members may not realize that their health problems are related to a nearby CAFO unless tests are conducted and the results are publicized. But anyone who has ever been near an industrial livestock facility can tell you that there is one major impact that is definitely not subtle: the smell.

Odor is more than an inconvenience. Studies show that chronic bad odor can have significant health effects. Odor also compromises the quality of life of rural residents.

One study in North Carolina compared residents living within 2 miles of a CAFO to residents not living near a CAFO. The CAFO community reported significantly greater frequency of headaches and burning eyes than the other group, which researchers attributed to the concentrated odor. These residents also reported significantly more times during the day when they could not open windows or enjoy the outdoors. Residents of communities down-wind from animal facilities often report significant mood disturbance, tension, depression, anger, fatigue, and confusion.²⁶

Odor also affects the rural economy. Would you want to live next to an operation so smelly that you couldn't open your windows? A 2001 study by a national property appraisal firm found that property values around CAFOs could decline by anywhere from 50% to 90% due to "diminished marketability, loss of use and enjoyment, and loss of exclusivity."²⁷ State tax tribunals in Michigan reduced the assessed values of residential properties adjacent to CAFOs by between 50 and 66% because of flies and odor.²⁸

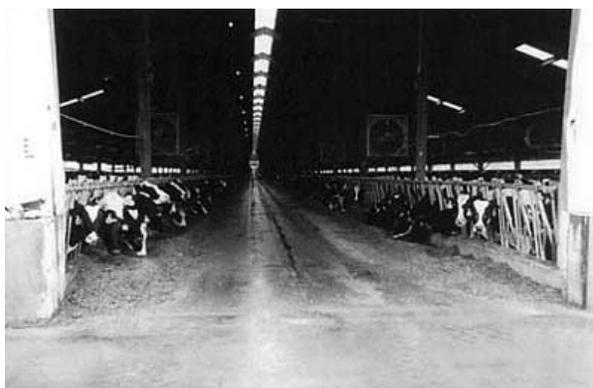


Photo courtesy factoryfarm.org

Encouraging Monoculture

Researchers also note that industrialized livestock production promotes a system where feed crops are grown on large, specialized farms and feed is shipped considerable distances to reach the CAFO.



Soybeans as far as the eye can see.

Photo by Elanor Starmer

Large-scale, input-intensive grain and oilseed farming can have significant environmental impacts of its own, including soil depletion and water contamination from pesticide and fertilizer runoff. Transportation imposes environmental costs as well in the form of greenhouse gas emissions from semis carrying feed. And as we saw above, separating crop and livestock production creates numerous problems when the manure cannot be properly used or disposed of. The specialized, industrial model of production has reduced the presence of diversified farms and ranches where reasonable quantities of manure are used to build soil health—the kinds of farms and ranches that produced the majority of our meat and milk until the last third of the 20th century. The eventual disappearance of these small- and mid-sized farms would be a significant environmental—not to mention social and economic—blow to our society and food system.²⁹

Antibiotic Resistance

Industrial livestock production may be threatening the effectiveness one of the mainstays of our health system: antibiotics. Animals living so closely together are at risk for spreading disease, so many livestock companies require their growers to feed animals low doses of antibiotics as a preventative measure. In fact, some 70% of antibiotics used in the United States are fed to animals who are not sick.³⁰ Many in the scientific community have expressed concern that the system will increase antibiotic resistance and put human health at risk. A 2002 study found antibiotics in 1/3 of ground and surface water samples taken near hog CAFOs and in 2/3 of samples near poultry CAFOs. Studies show that manure lagoons can leach antibiotic-resistant bacteria along with other contaminants.³¹ Antibiotic resistance should be a major concern for us all: doctors report a growing number of illnesses that no longer respond to antibiotic treatment, resulting in prolonged illness or death in patients

with resistant strains of an illness.³² The American Medical Association now opposes the use of antibiotics in farm animals that are not sick.³³



Hogs are packed tightly together in this industrial facility, increasing their risk of spreading disease.

*Photo courtesy Institute for Agriculture and Trade Policy:
The Price we Pay for Corporate Hogs*

What Can We Do? Strategies for Protecting Health and the Environment

Communities mobilize against the health and environmental impacts of CAFOs for many reasons. They are spurred to act because of harm done to their property; because they resent the community strife that corporate livestock production creates as it pits CAFO owners and their non-CAFO-owning neighbors against each other; or because they believe that corporations have violated basic standards of fairness, foisting costs on the community even as they receive large tax relief packages, low-interest finance, and limited liability agreements from state or local governments.³⁴ Their resistance takes many forms and happens on local, state, and national levels:



This young advocate says no to CAFOs in Tennessee.

Photo courtesy factoryfarm.org

Fighting CAFO Pollution to Protect Health and the Environment

- **Keep control at the local level.** Communities in states with local control have passed county planning or zoning regulations to keep large-scale livestock facilities out. The ordinances can set limits on the number of animals allowed in a facility or set acreage requirements; dictate “setback” regulations that require facilities to be a certain number of feet from a road, waterway, or property line; or require prospective CAFO operators to apply for environmental permits or livestock waste permits before the county will issue a zoning permit.³⁵
- In communities where CAFOs are already operating, local environmental and public health ordinances have helped mitigate their effects. In Missouri, local groups passed health ordinances in twelve counties to keep swine facilities further from residential or public land.³⁶
- In states that do not allow local control, community members have used public comment periods for CAFO licenses to express their concerns to local policymakers. If residents can prove a CAFO will negatively impact their land, a construction permit can be turned down.³⁷
- Communities may be able to buy time to consider proposals for new CAFO construction by enacting a moratorium on new CAFOs until appropriate planning and zoning regulations can be put in place.³⁸
- **Work on the state level.** Communities can pressure state enforcement agencies through formal complaints and letters to the state agency in charge of monitoring and enforcement for CAFOs (often the Department of Natural Resources). Most CAFOs must also apply for permits with the state under the Clean Water and Clean Air Acts, so community members can organize to attend public permit meetings with state lawmakers. As a last resort, citizens are allowed to formally request the involvement of the federal Environmental Protection Agency by filing a citizen suit under the Clean Water Act.
- State-wide ballot initiatives are another option. In 1998, Colorado voters succeeded in passing Amendment 14, which placed stricter regulations on large swine CAFOs and mandated the use of lagoon covers for odor control.³⁹
- **Lobby on the federal level.** The Clean Water Act and the Clean Air Act must be strengthened to better address CAFO pollution and odor. Permitting requirements should be more strict, and the public review process for CAFOs must be thorough.
- **Support alternative livestock producers** through your purchases and by lobbying for government support for smaller-scale, diversified livestock operations.

For more information:

CAFO Pollution and Environmental and Health Effects:

- **The Institute for Agriculture and Trade Policy** has put out a series of detailed fact sheets on the problems of air and water pollution from CAFOs, health impacts, and impacts on workers. IATP also has information on how to make safer, more sustainable food choices. Access them at www.iatp.org/foodandhealth/issues_factoryfarms.cfm.
- IATP researcher **Marlene Halverson's** excellent report on the impacts of hog CAFOs is available at www.iatp.org/hogreport/index.html.
- Read a comprehensive report on CAFOs and air quality by researchers at the **U. of Iowa and Iowa State:** www.public-health.uiowa.edu/ehsrc/CAFOstudy.htm

Antibiotics:

- Read **Antibiotics, Agriculture, and Resistance**, a report by the **Land Stewardship Project**. www.landstewardshipproject.org/pr/2002/newsr_021218.html
- **Union of Concerned Scientists** is one of the leading groups working on the overuse of antibiotics in livestock production. Access their resources at www.ucsusa.org/food_and_environment/antibiotics_and_food/
- **Keep Antibiotics Working** is a coalition of health, environmental, agriculture and consumer groups with excellent information on the use of antibiotics in livestock production. www.keepantibioticsworking.com/

Take Action on CAFO pollution:

- Read a guide by **Diane Hatz**, former director of the GRACE factory farm project, on how to confront a CAFO: www.factoryfarm.org/guide/docs/guide.pdf
- The **Sierra Club** has resources on challenging CAFO pollution, including "Five Local Strategies to Keep CAFOs Out." www.sierraclub.org/factoryfarms/resources/strategies.asp.
- Find out about federal policy proposals from the website of the **Sustainable Agriculture Coalition** (<http://www.sustainableagriculturecoalition.org/>) and sign up for action alerts from the **National Campaign for Sustainable Agriculture** (www.sustainableagriculture.net) to find out how you can take action.
- Visit the website of **Food and Water Watch** for more information on the impacts of factory farming and how consumers can act to change it. <http://foodandwaterwatch.org/food>.
- Support sustainable, smaller scale livestock producers by finding alternative retail outlets in your area. Visit farmers' markets or make connections on-line through resources like the **Eat Well Guide** (<http://www.eatwellguide.org/>) and **Farm to Table** (<http://www.farmtotable.org/>).

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