Masthead Logo

Volume 2018 | Issue 2 Article 2

Spring 2018

Environmental Regulation of Hog Feeding Operations

Chen-Ti Chen
Iowa State University, ctc@iastate.edu

Gabriel Lade
gelade@iastate.edu

Environmental Regulation of Hog Feeding Operations

Chen-Ti Chen and Gabriel E. Lade
ctc@iastate.edu; gelade@iastate.edu

THE US livestock industry has experienced drastic structural changes over the last two decades. The industry has shifted towards greater specialization across production phases, increased reliance on off-farm inputs such as feed, and increased use of production contracts (McBride and Key 2013). One trend that is particularly relevant to Iowa policymakers, farmers, and rural Iowans is the increased prevalence, size, and regional intensity of large, enclosed hog feeding operations. Where many of the largest hog-producing states have seen modest increases or even declines in total hog inventories over time, Iowa has seen a steady increase in inventories since 1982 (Figure 1a). Within Iowa, production concentrates in north-central and northwestern counties (Figure 1b).

These trends are driven by scale economies and higher productivity of larger, specialized operations. Larger facilities, however, can create greater environmental risk for nearby communities. For example, larger operations generate more manure and less available nearby cropland on which to spread it. As such, the largest feeding operations, known as Concentrated Animal Feeding Operations (CAFOs), are regulated by the Environmental Protection Agency (EPA). In general, a hog feeding operation is classified as a CAFO if it has at least 2,500 hogs, though some smaller operations may also be regulated if they are nearby water bodies (EPA 2012). As with any environmental regulation, tradeoffs exist between the cost of these regulations to producers and the benefit to society of reduced pollution. In this article, we review the relevant regulations facing hog producers in Iowa and discuss future research of our own that will explore the costs and benefits of these regulations.

Iowa's Hog Industry

Iowa's hog industry provides tremendous economic benefits to the state. Hog sales in Iowa exceeded $6.8 billion in 2012, and hog inventories in that year were more than double those in the second-largest producing state, North Carolina (Figure 1a). Not surprisingly, Iowa is also the leading state in the number of CAFOs. In 2017, Iowa had around 7,800 feeding operations that raised at least 100 hogs. Nearly half of those operations (about 3,000) were CAFOs. (Iowa Geodata database https://geodata.iowa.gov).

As Iowa's industry has grown over, the size composition of producers has also shifted. Figure 2 shows that despite the large growth in hog inventories, the number of hog farmers has steadily declined since 1992. Meanwhile, the proportion of large operations increased. In 1982, around 80 percent of the state's hogs were on farms with less than 500 head, and only a tiny fraction of producers had more than 2,000 head. Fast forward to 2012, and these statistics show a very different story. Just under 30 percent of hog inventories in Iowa are on farms with

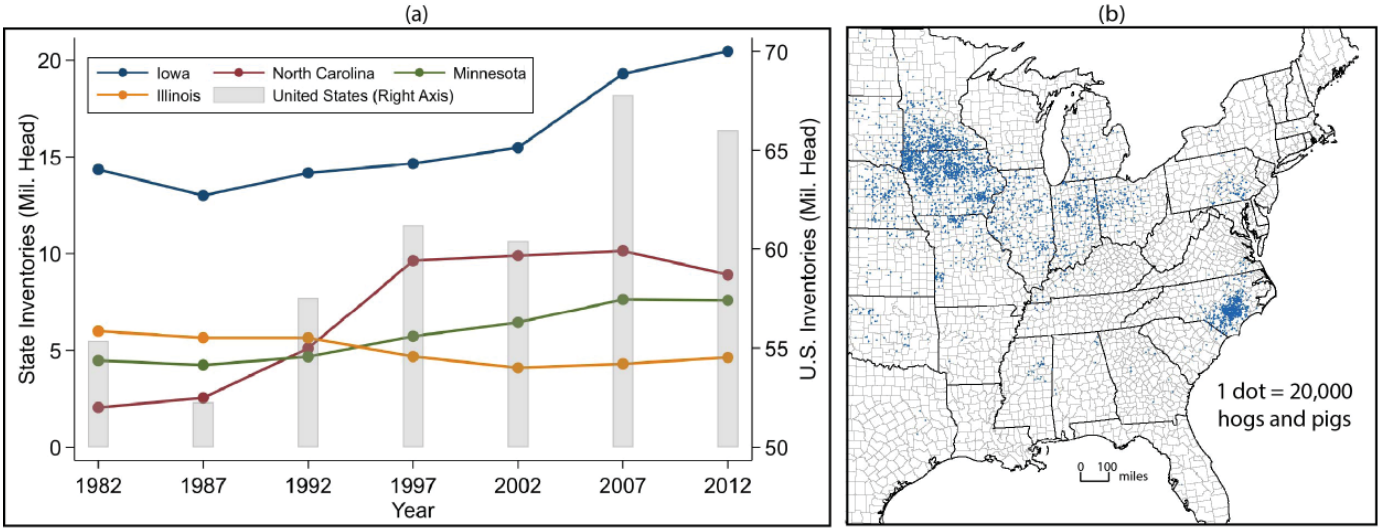

Figure 1: Hog inventories over time and regional concentration

Source: USDA Census of Agriculture, 1982–2012

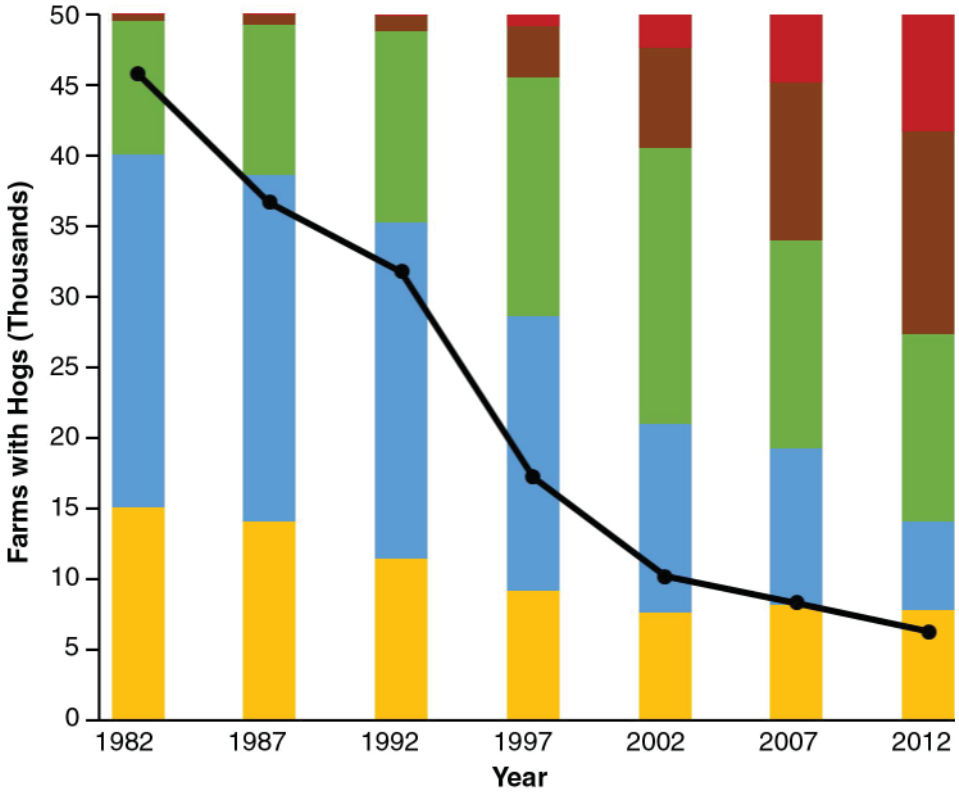

Figure 2: Iowa Farms with Hogs and Hog-operation Size

Source: USDA Census of Agriculture, 1982–2012

less than 500 head, while over 40 percent of inventories are on farms with more than 2,000 head. This shift in industry structure is largely driven by scale economies (McBride and Key 2013). Larger, specialized operations can producer more hogs at lower costs.

Larger operations naturally generate more waste and can contribute to local environmental pollution. In 2003, the EPA estimated that AFOs in the United States produced more than 500 million tons of manure. When applied inappropriately to local lands, manure can increase nitrate pollution in surface waterways and groundwater. Large feeding operations also produce local air pollution, emitting ammonia, methane, and particulate matter that may pose health risks to nearby populations (Hribar 2010). Further, animal feeding operations emit greenhouse gases (including methane, a particularly potent greenhouse gas), and produce odors that may be unpleasant to local and downwind communities.

Due to these issues, the expansion of the hog industry in Iowa has some raised concerns from local communities and environmental groups who seek better regulations to limit adverse impacts of the industry.

Federal Regulation of Animal Feeding Operation

CAFOs are regulated by the US Environmental Protection Agency (EPA) under the Clean Water Act (CWA). The most recent regulations were passed in 2003 and 2008, which updated and strengthened previous CAFOs rules. The 2003/2008 CAFO rules are examples of what economists refer to as 'size-based' regulation. In general, the CAFO rules apply only to animal feeding operations that exceed a certain size. When an AFO exceeds this threshold, they are officially designated as a CAFO and are subject to stringent pollution control and permitting requirements.

While regulatory authority over CAFOs ultimately resides with the EPA, much of the design and enforcement activities of AFOs are delegated to states. In Iowa, the Department Natural Resources (DNR) enforces most AFO standards. Iowa DNR categorizes AFOs into two types: confinements (totally roofed) and open feedlots. Most hog operations in the state are confined. The DNR requires all hog feeding operations with greater than 500 animal units (roughly 1,250 hogs) to develop a manure management plan (MMP) and submit annual updates.

The DNR also created the Master Matrix, a scoring system to evaluate the siting of confinement AFOs. Proposed operations in nearly every county in Iowa must submit a Master Matrix. The form scores proposals based on their location (e.g., distance from water sources), practices (e.g., covered liquid manure storage structures), and size. Producers may commit to different site characteristics and manure management practices to earn points. The more points a proposed project receives, the fewer impacts the operations will be evaluated to have on nearby communities as well as water and air quality. A proposed site is approved for construction only if it scores at least 50 percent of the full score available and at least 25 percent for each of three subcategories (water, air, and community impact).

While the master matrix and MMPs apply to all but the smallest AFO in the state, AFOs face especially stringent rules when they fall under the purview of the CAFO rules. CAFOs are designated as point-source polluters under the CWA. As such, these facilities must obtain discharge permits, submit comprehensive nutrient management plans, and may be required to invest in many more mitigating practices to ensure they will have limited impacts on the local environment.

continued on page 10