

Tax Policy and Swine Production in Iowa, United States

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Abstract

This paper examines county level decision-making regarding swine confinement permits in Iowa. The case study follows a 2003 Iowa State Legislature ruling that gives county supervisors the option to adopt a detailed Department of Natural Resources Master Matrix plan for swine manure management. In this research, I sought to understand environmental policy conflicts associated with industrialized hog production. This study examines four counties in North Central Iowa located in the region of rapidly expanding, corporate-formed, swine confinement operations. Ethnographic field research was conducted from May 2003 to October 2006. Comparison of qualitative and quantitative data for each of these four counties reveals different stakeholder and agroecology dynamics at the level of county decision-making processes. I explain these differences in terms of a family farm-corporate agribusiness continuum which reflects diverse local agricultural attitudes and practices related to environmental values, economic rationales and social investments. In some rural areas where family farm agricultural attitudes and practices related to livestock production persist along side of corporate agribusiness, there exist some county assessors, engineers, and auditors who seek to protect family farm social and cultural interests because of their stabilizing effect on the local environment and economy. This study explains why local county-level decision-makers have become proactive in supporting family farms and local businesses by challenging state policies biased in favor of corporate agribusiness.

Introduction

The March 2003 Iowa State Legislature decision (Senate File 2293) gave county boards of supervisors more control over decisions to permit or prohibit livestock confinement operations. The decision and the decision-making process reflected economic, political and environmental issues for various stakeholders. (1) The law reflected an acceleration of the centralization of hog production in the hands of fewer and larger externally funded agribusiness interests that was causing conflict between corporate agribusiness interests and local family farmers over access to markets and increasingly higher priced land. (2) The decision reflected the intensification of swine production and of the storage and application of manure that was generating conflict between urban residents and agriculture over residential quality of life issues such as air and water quality. (3) The Iowa State Legislature challenged any decisions made at

local levels that attempted to regulate agricultural activity, fueling a growing conflict between county elected and appointed officials and the state over the legal authority of county supervisors. (4) The decision was a response to conservationists' concerns that the industrialization of swine production threatened air and water quality, habitat for wildlife, and soil fertility for future generations. Further, these issues reflected growing competition between federal environmental agencies and agricultural programs over scarce resources allocated for environmental resource quality and protection. As a result, these agencies grew increasingly proprietary with their data to justify continued funding for their programs. The Iowa State Legislature ruling that gave county decision makers the option to adopt the Department of Natural Resources "Master Matrix"¹ was an attempt to address and reduce these conflicts.

The purpose of this study is to examine the effects of county level adoption of the Master Matrix both on those conflicts and on local agricultural decision making. I selected four counties in one region with a high concentration of swine confinement to compare local historical processes involved in expansion of swine confinement. Each county experiences a distinct arrangement of social, economic, political and environmental processes and thus represents a different place on the continuum between corporate agribusiness and small family farm swine production systems. If the Master Matrix has been successful, then there should be evidence that county level decision making processes regarding swine confinement permits changed in some way that contributed to the reduction of conflicts. No where does that appear to be the case. In fact, a more detailed examination of the process of filing the Master Matrix plan reveals that the plan may assist corporate expansion because it gives legal legitimacy to the systematic coordination of manure applications over increasingly larger fields. The plan also encourages corporate operations by providing tax breaks for manure pit construction to agribusiness partners in limited liability risk management strategies, if they follow the state policies. In addition, the Master Matrix does not appear to coordinate local family farmers in cooperative agreements that would allow them to continue with business as usual.

In their study of the public policies that are necessary to protect America's farms and farmland and the power inequities associated with them, Tom Daniels and Deborah Bowers (1997) argue that protection programs must develop out of local initiatives that fit local farming communities and local political realities. My study makes some specific recommendations for local level public participation in the comprehensive planning process for agricultural land use in order to strike a better balance between the rights of private property owners to maximize economic gain and the long term public good. It also demonstrates Timothy O'Riordan's claim that linking human well-being to ecosystem functioning to influence democratic processes and promote environmental sustainability and social justice requires multiple alliances at the local level (2005).

While political ecology analysis emerged out of Third World political realities, this study asserts that it is appropriate to apply it to analyses of agricultural resource-management conflicts between the state and local decision-makers in Iowa.² The key contribution of political ecology analysis is in the increased understanding of environmental conflicts and political responses at local levels in the context of state-level power mechanisms (Bassett and Zimmerer 2003). By examining how people make economic decisions about environmental resources through political processes, it is possible to demystify resource management at micro levels and thus reveal the disparity of power among the actors. This requires both careful analyses of the assumptions of rational economic behavior, as well as placing into particular historical contexts the discourses used by public institutions (Wainwright 2005).

Historical Processes

Examination of ramifications of the Master Matrix ruling in the four counties reveals two political relationships to the biophysical environment that are in conflict. One is how to increase the profitability of corporate agribusiness, requiring more hogs produced per unit of land and thus more extensive dispersal of hog manure. The other political relationship to the biophysical environment is how to support existing small family farms and their mode of extraction from the biophysical environment, requiring protective regulations and tax policies. Local decision makers are charged with swine confinement permit approval and tax base management and thus are at the center of both dynamics. While it can certainly be argued that the State of Iowa can encourage and protect the interests of both family farming and corporate agribusiness, this study argues that the two do not coexist well at the county level because local governments must enact tax policies that inevitably favor one strategy over the other.

State-level Dynamics

The Iowa State Legislature has historically seen the state's leadership in the nation's corn and swine production as central to its economic strength.³ In response to the low corn prices of the 1980s, legislators

sought to boost the market for local corn by increasing the state's national share of swine production. Also in the 1980s, Iowa meat packing plant owners from outside the state pressured the Iowa State Legislature for tax relief. They argued that they would save the many jobs threatened by closure of the smaller plants throughout the state. Packers threatened to take their industry elsewhere if the state did not provide tax relief. The legislature complied and recast its sights toward attracting more corporate agriculture capital, with jobs created by packing plants like Tyson Foods' Iowa Beef Packers being filled by non-union minority refugees and immigrants (Migration Dialogue 1996). In 1982, the state established 700 "agricultural areas" that received tax benefits and legal protection against law suits.

State and federal programs granted tax advantages to corporate operations to help them educate and pay employees. A five-year depreciation schedule of livestock buildings allowed producers to deduct the cost of a building from taxable income, although this caused fiscal short falls for local governments who lost tax revenues (Interview with Butler County Auditor, 2005).

At the same time, due to the larger farm crisis, Iowa experienced a steady decline in its rural population from 41.1% rural in 1980 to 38.9% rural in 2002 (The State Data Center 2006). This comparative study of four counties shows that externally based agribusiness corporations first entered counties in the early 1990s that had already experienced both rural out-migration and consolidation of land holdings two decades earlier. Large holdings gave Heartland Pork Enterprises and Iowa Select access to the crop land needed for manure management, a necessary requirement for gaining permits to build swine facilities. In addition to the tax breaks they were given, local tax revenues benefited them through a job training program that helped community colleges train workers. The tax base in rural counties experienced rapid change that stressed and strained county government systems and services. These changes affected each county in different ways.

Local-level Dynamics

Local communities and economies were transformed as smaller operators experienced the first squeeze in lower prices due to increased production by large producers. Then smaller operators were cut

out of the markets when the large regional packers like IBP (Iowa Beef Processors, now owned by Tyson Foods) began accepting only hogs contracted from large operations. When family farmers could no longer compete, vertical corporate integrators bought them out at rates that were not favorable to family farmers. These integrator corporations—who control production, processing and wholesaling—further expanded as additional land adjacent to swine confinements went for sale because of odors, often at lower prices. The new agribusiness managers did not replace as many people and jobs as they displaced (Ikerd 1998). Local residents also noticed that corporate employees didn't move into the community to participate in and support local businesses, schools and churches. Some local farmers and agribusiness services managers also got involved in the swine confinement expansion through limited liability corporations, although frequently they were not residents of the county where the confinements were built. These local operations resembled the external integrators in the following ways: 1) they set up large confinement buildings in local areas without checking first to see if any nearby neighbor's quality of life would be affected; 2) they set up the confinement buildings far from their own residences; 3) they received tax relief for construction of pits and took advantage of corporate income tax rules; 4) as limited liability corporations, they were personally protected from any financial losses or lawsuits the operations might incur.

Local communities were further transformed socially when swine confinement operations appeared under the names of local farmers with backing by multiple non-local Iowa business investors. These investors and partners followed the corporate agribusiness model of not living on or working at the swine confinement sites. Corporate partners were frequently construction or electrical companies and one of the partners was usually a local or regional feed processing company. The local farm partners argued that the corporate model provided the only strategy for them to stay in business or to compete with the larger corporations. Their more traditional neighbors argue that this is how those other farmers expand their operations and gain more political and economic power over family farmers.

Perceived by county managers as a problem with the transformation of the local rural economy was that those counties that had previously relied on local

businesses to support rural community institutions lost more than they gained from regional businesses who argued that their survival as “the little guys” was better than giving it all to “the big guys.” Family farmers and local business operators did not see their ability to leverage capital, reduce risks, avoid taxes, and increase environmental contamination as any different from those of external corporate operations. Local county auditors argued that the taxes paid on the new hog confinement buildings did not compensate for the loss of tax revenues spread out over the wide range of traditional agricultural properties and the small businesses gradually lost over the last twenty years. The presence of industrialized swine confinement operations might be tolerated at the county level when growth in tax revenues in diverse urban industrial sectors compensates for the loss of traditional, rural economy, tax revenues. This, however, is not the case in rural counties with little or no non-farm industrial growth.

In those counties where urban industrial growth is not present, the growth of corporate agribusiness on family farms threatens local economic systems because of the inequities created in the tax base. While agricultural production in some sectors may increase as a result of industrial agricultural production, profit margins are narrower and profits are extracted (Thu and Durrenberger 1998:7). In addition to their negative effects on the local economy and tax base, large corporate operations are the source of environmental issues that threaten the property values of rural and urban residents. This strains the economic base and places higher burdens of taxation on remaining residents.

Local governments incurred environmental clean up costs in many cases. Manure spills polluted local streams and wells that drained into underground aquifers (Iowa Department of Natural Resources 2006b). Corporate operations pumped millions of gallons of water a day from underground systems into facilities (Thu and Durrenberger 1998). Large trucks hauled cement, construction materials and hogs to market on county roads, creating constant demands for upgrading and maintenance. Dust and gases in confinement buildings caused health problems for employees and animal diseases spread rapidly (Donahue 1998). Rural neighbors complained about

health problems due to deteriorated air quality (Thu and Durrenberger 1998).

Ideal Types

While the sub-agricultures of family farming and corporate agribusiness both share a common means of surplus production in a competitive market place, they differ in mode. These are ideal types, and individual farmers do not fit neatly into these two models in particular local contexts. Rather, their individual strategies typically represent a place on a continuum between dependence on family labor and local credit vs. dependence on wage labor and outside investment. Tax policy can influence which of these strategies is possible or lucrative.

The interests of family farmers and corporate industrial agribusiness began to diverge in Iowa as the number of farms declined, the average size of operations increased, and operations began to specialize in either grain or livestock. The transformation of agricultural economic activity and traditional family farm rural community economics in the last twenty years is centered in social reproduction. The family farmer is horizontally integrated in a system of local cultural institutions. They personally own most of their land, livestock and equipment as vehicles of entrepreneurship and resources for adaptations to a wide variety of management strategies and environments, both natural and market. They borrow capital locally, buy locally, pay local taxes, and make their own business decisions based on a sophisticated knowledge of global and local realities. They engage in face-to-face interaction with family and kin, neighbors, and members of the small town social and business community. They have an identity as a social actor within the community and take pride in honesty and integrity in business dealings. Economic activity is governed by social rules that value physical labor, individual innovation, calculated risk-taking, social responsibility, and stewardship of resources. The family farmer engages in farming to form and protect a social and cultural identity within a family and a moral community. They participate in the development and celebration of community institutions like schools, churches, service clubs and Main Street businesses. Family farmers are also actively concerned with the preservation of environmental

resources as land owners, business operators, and residents whose primary form of recreation is the enjoyment of nature through hunting, fishing, boating, biking, and hiking.

In contrast, the corporate industrial agribusiness managers do not personally own the land, labor or capital associated with their business. They do, however, have an investment in one or more dimensions of it, usually as a limited liability partner. The means of production, including their labor, all belong to the corporation from which they draw a salary. They are vertically integrated with outside business as a source of financing and supplies. They produce for exterior markets and pay externally derived debts. The corporate agribusiness manager buys little locally, and participates little in the support of local businesses and local sales tax options. Economic decisions are based on formulas and contracts for reducing risks and enhancing profit calculated in terms of corporate externalities, not local social, cultural or economic constraints or traditions. The corporate agri-business managers do not have time for "neighboring." Their identity is based on an economic conception of individual management style and demonstration of urban consumer patterns.

The corporate agribusiness manager participates less in community institutions and is not likely to want to retire in the area, hence there is less of a personal investment in the quality of life issues associated with the local natural environment. But through the rights of private property ownership, corporate agribusiness managers have the freedom to use the environment for economic gain as they see fit and the law allows. Corporate agriculture is an economic system in which greater emphasis is placed on private ownership of natural resources to make a living from resources for one's exclusive benefit (Bates 1998:38). Bates argues that this freedom to pursue profits at the expense of resource sustainability, "significantly alters an individual's ties to the group." In local rural communities, corporate agriculture increasingly places the interests of the environment, local societies and business in conflicts with each other.

Family farm vs. corporate agribusiness typologies are used here to characterize different decision-making challenges at county levels regarding local tax

structures. However, these local political issues were not recognized in state-level policy discussions that influenced the development of the Master Matrix plan for local environmental regulation of manure management. Thus, local decision-makers were not given effective legal power to prohibit large-scale confinement operations when they adopted the Master Matrix. There is evidence, however, that local political processes regarding environmental regulation have been effective in slowing the advancement of corporate swine operations in two counties where family farming is still the dominant mode of agricultural production. But the adoption of the Master Matrix has little if nothing to do with it. The data and analysis that follow clarify how county level assessors, engineers and auditors in two counties challenge and resist the threats of industrialized swine production to protect not only the environment but also the local tax base.

Methods and Data Analysis

Family farmers, corporate agribusiness operations, federal and state environmental agencies, urban residents, state legislatures and county government elected and appointed officials are all stakeholders in swine confinement permit politics. Qualitative analysis of ethnographic data illustrates the roles of these stakeholders in specific local contexts. Quantitative county level decision making data compiled by the Iowa State University Extension service provides the historical contexts that explain, in part, why industrial swine confinements are more prevalent in some counties than in others.

Ethnographic data collected from May 2003 to October 2006 consists of the following: 1) review of tax records available in public records at county assessor's offices; 2) review of county and printed regional environmental regulatory agency (Department of Natural Resources and Natural Resource Conservation Service) policies and programs; 3) four semi-structured interviews with federal agency officials (Department of Natural Resources, Conservation Reserve Program, Farm Service Agency, and National Resource Conservation Service) at the regional and county levels; 4) ten semi-structured interviews with elected and appointed county supervisors, auditors, assessors, engineers

and their staff persons; 5) participant observation and semi-structured interviews with seven local family farmers; 6) one semi-structured interview with a regional contractor involved in a limited liability swine confinement operation partnership; 7) observation of a small town city council meeting in which the threats to small towns by hog confinement operations were discussed; 8) two newspaper articles reviewing the conflicts between local residents and corporate confinement operations in two counties under study; and 9) one interview with a small town city attorney.

Public records compiled by assessors, auditors and engineers at county levels include building permits and manure management plans. The Iowa Department of Natural Resources website provided data on animal feeding operation requirements and forms. Department of Natural Resources high and low resolution maps show locations of permitted and non-permitted animal feeding operations, registered feedlots, animal confinements by number of animal units in Iowa, and significant environmental features (e.g., groundwater vulnerability and aquifers, sinkholes and drainage wells, manure spills, impaired watersheds, livestock burial zones, reported fish kills). County offices of federal agencies such as the Natural Resources Conservation Service, Conservation Reserve Program, and Farm Service Agency also provided public information regarding their databases and programs. Iowa State Extension Directors provided county level data and manure management literature.

Data from Iowa State University Extension bulletins identify historical trends at county levels such as (1) population declines; (2) increase in Hispanic immigrants as corporate agri-business laborers; (3) rates of decline in the number of farms; (4) increase in average farm size; (5) rates of change in the numbers of farms selling hogs and pigs; (6) total number of hogs and pigs sold; (7) percent of market share and percent of total market value for hogs and pigs; (8) percent of change in farm earnings; and (9) the percent change of the market value of agricultural products in the local economy. These data characterize the counties under study in terms of family-farm or industrial agri-business models. Additional demographic and farm production data were gathered from the Iowa State

Data Center and the Office of Social and Economic Trend Analysis at Iowa State University.

Unstructured interviews with farmers in each of these counties enabled characterization and comparison of the distinctions between family farmers' and corporate agribusinesses' interests as the dominant mode of agricultural production in each county. Semi-structured interviews of county supervisors, engineers, assessors, and auditors revealed how these local decision makers characterize their agricultural constituencies. Interviews also revealed how these elected and appointed professionals react to changes in tax rulings and regulations generated at the level of the state.

Findings and Results

Iowa State University Extension data (1999) shows that Iowa experienced a steady decline in the number of farms and the number of farms producing hogs since 1969. At the same time, the average acres of farms increased. Agricultural production was concentrated in fewer larger operations. The percent of agricultural earnings from farms declined in the total economy between 1987 and 1997. As farm operations got bigger, there was a shift in earnings from agricultural production away from the farming to the non-farming sector, except where corporate integrated swine production was concentrated. Between 1990 and 2000, the state wide share of agricultural earnings from farms dropped from 6% to 4.2%. Agricultural profits were increasingly extracted from rural communities, but the process varied greatly by counties, as is summarized in Table 1.

Variation in the ways counties experience change in swine production illustrates the meeting of state-level political and economic forces with local cultural, geographic and biosphere realities, which is discussed here in some detail.

Marshall County

Marshall County has only one town with over 2,500 people. It is the home of Swift and Company meat packing plant and a major rail transportation hub. It was among the only fourteen Iowa counties that did not initially adopt the Department of Natural Resources Master Matrix because supervisors feared

Table 1. Summary of local decision making data reflecting four local processes and realities.

County and Swine Production Operation Types	Rural Population Trends 1980-2000 ¹ and Density ²	Farm Unit Size Trends 1969-1997 ³	Swine production Trends 1987-1997 ⁴	Agricultural Earnings Trends 1990-2000 ⁵	Biosphere Characteristics ⁶
Marshall County: did not adopt the DNR Master Matrix • <i>Family Corporation Agri-business</i>	Due to growth in industrial city of 26,000 residents total population is only down 6%; absolute rural population is down 14%; Hispanic population is 9%; 68.7 persons per square mile in 2000; 33.5% rural in 2000.	Number of farms decreased by 59%; average farm size increased by 66% to 350 acres, 7 higher than state average.	Home of a Family Farm Agri-business Corporation hog confinement operation; number of farms selling hogs dropped by 84%; total market value down by 3.6%; number of hogs and pigs sold did not rise much since 1969. Swift and Co. Packing Plant 3.4 pigs/person in 2000	Percent of farm earnings in the total economy down 25%; absolute farm earnings down 2.2%.	<ul style="list-style-type: none"> • Rich soils • Large sections of flat land. Low erosion • Little vulnerability to ground water pollution • Aquatic life supported is threatened in public wildlife areas
Hardin County: adopted the DNR Master Matrix • <i>External Integrators</i>	Total population is down 13%; absolute rural population is down 24%; Hispanic population is only 2.4%; 33.0 persons per square mile in 2000; 73.9% rural in 2000.	Number of farms decreased by 47%; average farm size increased 44% to 441 acres, 98 more than state average.	Home of Iowa Select and Christensen Farms producers; number of farms selling hogs dropped by 75%; total market value increased by 52%; number of hogs and pigs sold increased by 68% since 1969. 47.2 pigs/person in 2000	Percent of farm earnings in the total economy increased 42%; absolute farm earnings up 2.1%.	<ul style="list-style-type: none"> • Rich soils • Large sections of flat land • No wetlands • Little vulnerability to ground water pollution
Butler County: adopted the DNR Master Matrix • <i>Family Farms</i> • <i>External Corporate Integrators</i>	No towns over 2,500; absolute rural population declined 20%; Hispanic population is only 0.4%; 53.3 persons per square mile in 2000; 100% rural in 2000.	Number of farms decreased 36%; average farm size increased 30% to 299 acres, 44 acres smaller than state average.	Contractors for Iowa Select, Heartland, Kairos, and local corporate operations; number of farms selling hogs dropped by 79%; total market value down by 2.5%; number of hogs and pigs sold up by 13.5% since 1969. 13.5 pigs/person in 2000	Percent of farm earnings in the total economy increased 7%; absolute farm earnings dropped by 6.8%.	<ul style="list-style-type: none"> • Rich soils • Gently rolling sections vulnerable to erosion • Large public wildlife and wetlands management areas • Ground water contamination
D. Bremer County Adopted the DNR Master Matrix • <i>Family Farms</i> • <i>No External Corporate Integrators</i>	Due to growth of urban community of 9,000, total population is down only 6%; absolute rural population is down 18.5%; Hispanic population is only 0.3%; 53.3 persons per square mile in 2000; 67.2% rural in 2000.	Number of farms decreased 36%; average farm size increased 31% to 243 acres, 100 acres smaller than state average.	Family farm swine operations; no integrators allowed; number of farms selling hogs dropped by 80%; total market value increased 14.7%; number of hogs and pigs sold increased by 21% since 1969. 5.5 pigs/person in 2000	Percent of farm earnings in the total economy increased by 46.3%; absolute farm earnings dropped by 3.5%.	<ul style="list-style-type: none"> • Rich soils • Large sections of flat land • Vulnerable to contamination of agricultural drainage wells and aquifers

¹ Data for Decision Makers, September 2002, Iowa State University Extension to Communities.² General Population Characteristics. Prepared by: State Library of Iowa, State Data Center Program.³ Agricultural Data for Decision Makers, September 1999, Iowa State University Extension to Communities.⁴ Ibid.⁵ Ibid.⁶ Iowa Department of Natural Resources 2006.

it would restrict the economic options of their local family farmers. Local decision makers are concerned about the consolidation of one large family agribusiness corporation that has expanded its land holdings and swine production in the area over the last twenty years. But they support the locally owned corporation because it supports local businesses and contributes to the local tax base even though it is vertically integrated to markets and feed suppliers.

Only 8% of farms sold hogs and pigs in 2002. Of those farms, 40.2% had 1,000 animals or more (Office of Social and Economic Trend Analysis 2006a). Still, county officials recognize the non-trivial distinction between large family owned agribusiness and external corporate integrators. The number of farms decreased by 59% as land holdings are increasingly consolidated in the hands of a few. This makes even large family agribusiness corporations vulnerable to external integrator competition and places the local tax base in jeopardy if profits are extracted. Feed sales went down 11.5% from 1980 to 2002 and cash livestock sales also went down 21% from 1980 to 2002.

Decision makers are not overly concerned about the decline in farm earnings overall or the decline in the percent of farm earnings in Marshall County over the last decade because urban industrial growth appears to compensate in taxable revenues. The decline in rural population and the labor shortage it could represent to urban growth is currently compensated for by Hispanic immigrants.⁴ One hundred percent of the employed residents actually worked within the area in 2000.⁵ Nor are the county officials particularly worried about the biosphere of the county. Pasture lands (2.5% of total farmland) and woodland acres (1.9% of total farmland in 2002) are low and most of the farmland is under row cultivation. The land is relatively flat and erosion is not a significant problem. There are few agricultural drainage wells and aquifer areas in Marshall County and hence the ground water demonstrates little vulnerability to pollution from contamination. There are high phosphorus inputs but outputs are fairly balanced. There are no significant wetlands areas or streams. Still aquatic life support is threatened in the 792 acres of waterfowl and public wildlife management areas.⁶

Hardin County

Hardin County has two towns with populations over 2,500. It is the home of Iowa Select headquarters and Christensen Farms regional offices as well as their production sites. It has major rail service to Marshalltown and the Swift and Company packing plant. County supervisors did adopt the Master Matrix. This decision resulted in a room size basement vault filled with several hundreds of manure management plans completed by corporate professionals. The existence of these plans, however, does not require county-level monitoring, nor does it establish a staff for such purposes. If spills or leaks or other environmental violations occur, laws define penalties, but not always their collection. The adoption of the Master Matrix in Hardin County has not given local government greater power over these matters, nor has it restricted or slowed the rate of hog confinement expansion. It has, however, clarified the environmental regulations for the participants and provided a legal authority for their enforcement.

Corporate agribusiness dominates in Hardin County, and has played a primary role in the expansion of swine production. The largest and the second largest Iowa-based swine producers are located there. They own feed mills, a swine genetics company, a nutrition-and-research program, an agricultural builders division, and a management information system. The feed purchased in Hardin county almost tripled from 1980 to 2002. Cash livestock receipts were up 28%. One web site asserts that "from farrow to finish, we leave no stone unturned in our efforts to lead the industry."⁷ Consolidation of agricultural operations has led to decreased numbers of farms and the rural population by alarming rates. Only 16.5% of farms sold hogs and pigs in 2002 and of those, 49% had 1,000 animals or more. Growth in vertically integrated swine confinement operations requires farm operations much larger than state averages (See Table 1). Large land holdings greatly facilitate the management of manure from large swine production sites. The total number of hogs and pigs sold, the market value of hogs and pigs, and farm earnings have increased substantially.

Hardin County represents the successful model of agri-business development the Iowa State Legislature hoped for decades ago. Farm earnings increased

by 42%. But there are problems as well. The overall population is down 13% in the last twenty years. And while corporate operations have provided urban industrial growth, the entire county is more dependent on one revenue producing industry that does not circulate locally much of the profits it acquires.

Decision-makers in Hardin County are not concerned about the environment in spite of the very high nitrogen and phosphorus inputs, because there are no large vulnerable ground water areas. There is low vulnerability to pollution from manure contamination. In addition, Hardin County has no wetlands and only 119 acres of public wildlife management areas. Its relatively flat farmland is largely in row crop production. Only 1.1% of the total farm acres were in pasture in 2002 and only 2.2% was in woodland acres (Office of Social and Economic Trend Analysis 2006b).

Butler County

Butler County is one of the most rural counties in Iowa with no towns over 2,500 and therefore its population is considered 100% rural. It has two rail lines, one of which is connected to a major grain buyer who is also involved in swine confinement operations. The human population steadily declines but its rate of family farm operation decline due to land consolidation is one of the lowest—with the average farm size at 44 acres smaller than the state average. Due in part to stable commodity prices and grain subsidy payments, farm earnings increased seven percent in the last ten years. The percent of farms with hogs and pigs was 10% in 2002, and of those farms, 29.3% had 1,000 hogs and pigs or more. Feed purchases were up slightly from 1980 to 2002, but cash livestock receipts were down 10.6% from 1980 in 2002. Local farmers value the sense of community they sustain with small operations, increasingly taking outside jobs to supplement their farm earnings. Only 59% of employed residents actually worked in the area in 2000. Swine production is represented by both family farm and corporate operations. Almost no family farmer owns or operates all of a swine production site on his property even if he is the primary investor and source of labor. He almost always has one or more partners who helped finance the construction of the operation or who provided

feed and additional services. Hog farmers are often contractors for Iowa Select, Heartland, Kairos, and local corporate operations.

The lack of local industrial and other forms of off-farm employment makes the construction of livestock confinement operations on existing family farms attractive to some operators. Older operators can incorporate their sons into the family farm by establishing confinement operations with the aid of external financing. One local farmer told me that this is problematic, however, as the sons tend to resent what they perceive to be a wage labor job with no benefits, little time off and no vacations. Sons are less likely to want to stay in family farming unless they can assume control of large grain operations which provide maximum scheduling flexibility for vacations and off-farm income opportunities. And even farmers don't like to live next to hog confinement operations. More likely, a family farmer will construct a site on a remote unoccupied building site. Often these sites are constructed near streams where farming is less productive.⁸ He will do so with the financial assistance of a few limited liability partners in the area who profit from the construction of the buildings, installation of electrical wiring and purchase of feed.

The expansion of corporate swine operations in Butler County is slowed by the smaller size of land holdings, which makes it difficult to obtain permits for manure application. The average farm operation in Butler County includes land that is both owned and rented, but seldom contiguous. Operators typically expand their holdings in 80 acre or fewer parcels at a time when land is sold or rented to them on the basis of their social connections as well as their financial strength. The small land holdings and relatively high number of rural residences present a challenge to the number of manure easements large operators can obtain for wide scale manure application.

Neighbors of confinement operations may sign agreements to have manure applied, but a local farmer told me that most are reluctant to do so because of the loss of control over application timing. They are also reluctant to do so because the expansion and increasing size of hog confinement operations threatens their way of life. In addition, local farmers are reluctant to sign manure application agreements with operators who

need increasing numbers of acres than first figured because manure cannot be applied at the same rates every year, according to one local farmer.

Existing manure management permits are typically granted to operations of fewer than 1,000 head of hogs scattered throughout the county. The assessor's office registered a concern, however, that many of the permit requests came from the same corporate entity. It is the large Iowa-based grain buying operation and feed supplier near the wetlands area that is also consolidating land holdings. Others are presented by local farmers who must list the names of the outside regional investors with a 20% or more share. This is the growing trend in 2006 as the numbers of limited liability corporation swine production units are increasing on the landscape, particularly in areas where large landholders can coordinate manure management plans.

Local family farmers have begun to organize to speak out against the expansion of these swine operations in the county. They are working to build coalitions with other Butler County residents who greatly value their outdoor recreational amenities. The county has a large number of acres in woodlands, wetlands, grasslands, streams, rivers, and wildlife and prairie preserves. It has 780.8 acres of wetlands and 4,380 acres of public wildlife management areas.⁹ Residents enjoy its bike trails, canoeing and fishing, camping, horseback riding, and hunting. Butler County has a high level of vulnerability to water pollution from contamination of wells and aquifers due to high nitrogen inputs.¹⁰ There is a trend towards locating hog confinements near a large wetlands area. The wetlands area is located near the site of a grain elevator company that was formerly locally owned, but is now a vertically integrated regionally owned feed supplier. Farmers reduced the pasture acres in half between 1980 and 2002 in favor of row crops, the number of woodland acres went up slightly in favor of private hunting preserves. Residents are actively involved in conservation programs and organizations. And while outside capitalization and contracts with vertical integrators is seen as risk reduction by a few, it is socially unpopular with local residents who still see expansion of production and financial integration with corporate outsiders as "risky business" and "environmentally unfriendly."

In summer of 2006, a group of local farmers in Butler County formed an informal coalition to enlist the support of rural and urban citizens in the fight to stop the expansion of swine confinement operations in the county. They wrote lengthy articles in local newspapers and appeared at city council meetings stating their concerns that outsiders were gaining permits to construct sites without the knowledge of local residents. In response to their public outcry, supervisors rejected the applications of two large corporate operations on technical terms allowed by the Master Matrix. Both of the corporate entities reported that they expected to reapply after complying with the requirements. But the local citizens published the names of the outside investors and the nature of the process by which they were able to purchase a local site in their neighborhood. They argued that the investors were not "good neighbors." As a result of their efforts, local citizens are becoming more alarmed and are joining political action groups with paid lobbyists in Des Moines.

Bremer County

Bremer County represents yet another model of local processes. It has one town over 2,500 and rail service to Waterloo, the site of a Tyson packing plant. Its rural population was 67.2% in 2000, slightly up for 1980 due to the expansion of acreage residences. Due to its urban community, 90% of employed residents actually worked in the area in 2000. Due to the efficiency of its small scale family farm operations, farm earnings continue to increase. There is a growing number of family farm and local agribusiness swine confinement corporations in the county, but they are small by comparison to the family corporation in Marshal County. The number of farms raising hogs and pigs in 2002 was 22% of the total number of farms. Of those raising hogs and pigs, 33.6% had 1,000 or more animals. Feed purchased went down slightly from 1980 to 2002 but cash livestock receipts went up 3% during that time. A number of local investors have formed limited partnership operations, although preservation of residential amenities and a traditional rural landscape are two reasons why large integrators haven't penetrated Bremer County.

Like Butler County farmers, Bremer County farmers have smaller than average farm holdings. They

have, however, converted one third of their existing pasture land to row crops or housing developments since 1997. Their woodland acres, however, remain stable but are only 2.6% of total farmland area. A diverse economic base supports a growing urban center¹¹ and affluent residents. Urban small scale manufacturing and medical services provide jobs that help stabilize the local economy. These jobs also provide more attractive additional earning opportunities for local farmers than do swine operations.

Bremer County residents are very protective of their local environmental amenities and the many attractive acreage residences scattered throughout the county. They are well aware that their water supply is vulnerable to contamination due to agricultural drainage wells and aquifers.¹² They have 677.8 acres of wetlands and 2,518 acres of public wildlife management areas with six rivers and streams. Their very rich soils on flat land receive moderate levels of nitrogen and phosphorus inputs, which are relatively well balanced with outputs. Erosion is not a significant problem.

One difference for Bremer County is the existence and enforcement of a local zoning law. The county supervisors enacted a subdivision zoning regulation for urban planning purposes some time ago. It was applied to confinement building permits, frustrating the application process for outsiders. The assessor and auditor offices also express concerns that large scale operations threaten the local tax base. But in July of 2006, they were threatened with a law suit over the legality of using the zoning ordinance reasoning to reject a large corporate swine confinement permit. Their policy is likely to change and more large scale swine confinements are likely to appear in Bremer County; particularly since several investors who have developed them in nearby counties engage in concrete and electrical contracting as well as feed milling there.

Comparison of Counties

The discussion of internal processes above needs to be placed in the perspective of how geographic factors influence variations in vertical integration of swine production in each county. I argue, however, that the role of external factors is small. For example, each of

the counties has access to train depots and rail shipment along interconnected lines. And while rail service is important in the export of grain from the area, the swine industry is more dependent upon trucking to move feed from large suppliers and to move hogs to local packers. Producers in all four counties are located within forty miles of a packing plant, accessible by major state or interstate highways. The proximity to packing plants is not deterministic of swine confinement concentrations; however, the proximity to feed operations, as is the case in Hardin County, does offer an explanation. All producers in all four counties are within 20 miles of feed suppliers. Manure management does offer an explanation for trends in swine confinement expansion. There is a limit to the amount of land available for manure application that does not pose a high risk of ground water contamination. The expansion into Butler County is explained in part due to the fact that Hardin County has reached its saturation capacity. But Butler County is more vulnerable to contamination than is Hardin County.

What is significant here are the specific differences in the biophysical environments of each county. Marshall and Hardin counties are home to corporate feed operation headquarters and packing plants as well as larger scale land holdings that have not, at this point, contributed to serious environmental contamination. Their public wildlife management and wetlands areas are significantly smaller than those of Butler and Bremer County and they have very few agricultural drainage wells and aquifer areas. In contrast, Butler and Bremer Counties have special areas of groundwater vulnerability. They also have high numbers of agricultural drainage wells and aquifers as well as high numbers of managed wildlife areas and wetlands. The United States Geological Survey reported that nitrate and phosphorus levels in Eastern Iowa streams were among the highest in the nation in 2001, frequently exceeding drinking water standards (USGS 2001). Due to the soil types, more nitrogen is applied in Butler County than in Bremer County. Butler County also has more rolling areas of farm land which contributes to greater erosion, which is a concern of the Department of Natural Resources. Erosion of soil particles can deliver significant amounts of phosphorus to streams in heavy rains or melting of snow. Excess

nitrogen and phosphorus have negative impacts on aquatic life and limit the use of water bodies for recreation and drinking water sources.

The ratios of swine/human populations in each county need to be considered in terms of the total biosphere and its nutrient economy, as one adult hog generates eight times as much solid waste per day as a human (Jackson 1998:105). Agricultural biospheres are open systems. Where high levels of nitrogen pose a threat to ground water, as is the case in Butler and Bremer Counties, even the escape of nitrogen into the atmosphere at the time of application can add to the problem. Gaseous ammonia can return to the earth in nitrogen-enriched rainfall. According to Jackson (1998), studies have shown that even minor increases in nitrogen in the biosphere reduce total species diversity. Run off occurs when soils become saturated, which is more quickly the case for soils with high clay contents where the absorption rate of manure is slow, as is the case in Butler County. This contaminates surface and ground waters. Concentrated manure can contaminate drinking water with disease bacteria and spread antibiotic resistance. The implications for human ecosystems are notable. Imbalances in nutrient management and bacteria populations in the ecosystem contribute to a lack of resilience and flexibility in the ecosystem, which must be maintained for adaptation of social systems (Bates 2001).

The profitability of corporate swine production depends on shifting the costs of environmental standards to other tax-payers. For example, there is no tax on manure pit structures if operators file a pollution control form to construct them. The costs of meeting environmental standards are lower in areas with lower population density and on land that has a greater absorptive capacity and, thus, a low risk of pollution (Beghin and Metcalfe 1998:3). Corporate operators seek land with soils that absorb well with low water tables and few drainage wells and aquifers in order to reduce their costs and comply with environmental standards (Beghin and Metcalfe 1998). This allows them to avoid the phytosanitary problems that result from manure surpluses. But in areas where the risks of contamination are great, such as Butler County, the costs of monitoring the effects of corporate operations to the biosphere,

outside of the private land on which they stand, is placed on tax payers. These costs are primarily the responsibility of state and federal agencies but they also involve costs to local taxpayers.

Policy Discussion

Scholars are calling for a broader discussion of economic well-being. "In addition to standard measures of economic success and resiliency," asserts Iowa biologist Laura Jackson, "we need measures of social acceptability, impact on the local economy, ecosystem effects, and costs of enforcement and monitoring" (1998:116). Additionally, Clifford (1998) argues that professionals and citizens need to be part of local environmental task forces that promote broader understanding of environmental issues and consequences, thus promoting both horizontal and vertical environmental decision making.

Local decision makers in counties with small-scale family farmers and vulnerable rural biospheres are increasingly asserting that critical state-level policy decisions and tax laws insure the agricultural economy and the environment for their future. They have become proactive in supporting the economic interests of local businesses and small scale family farmers because these enterprises stabilize the local economy and preserve the local environment. They seek to protect the natural environment because it guarantees greater flexibility in the future. Local officials argue that current tax codes favor the expansion of external corporate interests that make vulnerable the viability of small scale operations, the entrepreneurial talent of family farmers in local communities, and environmental resources. The Master Matrix does insure compliance with a set of standards, although it does not provide revenues for the monitoring of the standards or the maintenance of the files. Those costs are assumed by local taxpayers. In sum, the conflicts between family farmers and corporate operators, swine producers and rural community residents, and state and county government officials are intensified over confinement permits and manure management plans. These conflicts have resulted in the new alliances among stakeholders in Butler and Bremer Counties, the two counties in this study with the most vulnerable biospheres.

Environmental and economic data gathered by national, state, regional and county level decision-making agencies have political implications. Presently, the state legislature has acted without detailed knowledge of diverse local processes and realities. The coordination of these descriptive data by more integrated software programs would allow for more accurate and versatile analysis of public policies at local levels. Interactive databases would enable cost-of-community-services studies to better understand how the tax base is affected by changes in agricultural production. In Butler County, and elsewhere, family farmers experience a more intense tax burden on remaining farm operations as farmland values rise due to corporate competition for land. When farmland goes to industrial development of swine confinements, it is not taxed as industrial property. It gets the same discount as all farm operations. But local small businesses continue to pay taxes on 100% of their productivity. Rural county auditors argue that taxes collected from industrial swine operations do not compensate for those lost from the loss of smaller operations and the local businesses they sustained. But because large operations cause greater costs to roads and pollution to ground water, they contribute to a tax inequity at the local level.

In 2004, the League of Cities and Association of Counties, comprised of assessors and auditors, put together a proposal which they presented to the Iowa State Legislature in January of 2005 to address tax inequities they argue resulted from the corporate controlled industrialization of agriculture. The goal was to assess hog confinement buildings above and beyond the agricultural land values on which they reside. No one in the legislature signed on to it. According to the Butler County Auditor, "We've been abandoned by our legislators. They never ask us the consequences of their legislation. And they don't listen when we tell them. They don't understand what we are up against." The League and Association gave up on the swine confinement issue. Instead, they now propose that small town businesses be given exemptions like agriculture. These businesses have been taxed at 100% of their productivity while all agriculture has not. To protect the local tax base, local decision makers want to save

small town businesses as well as the family farm. Residential farm buildings owned by family farmers would still be protected by homestead exemptions. The exemptions are currently determined by counties who divide it between land and buildings for farmers. The local decision makers want to eliminate the agriculture credit for corporations but not the family farm credit. But counties cannot modify the existing tax code without state level rulings.

The current tax code does not distinguish between family farmers and external corporate entities in the assessment of property taxes on farm land. The land under swine confinement operations is taxed as farmland, based on its soil productivity and improvements such as wells and driveways. It is the productivity potential of the land for crops that is taxed rather than the potential for livestock activity. The taxes on farmland contribute to public services. These tax laws were established long ago when most farmers contributed to the need for and benefited equally from those services (Haygood 1949:677-678). Haygood argued as far back as 1949 that public policy makers need to understand that the tax load of agriculture varies in particular circumstances. Haygood further argued that when the agricultural economy is restructured, we need to ask if the costs of local services are evenly distributed among the economic groups in a community or even among the individuals within each economic group. The family farmer bears a disproportionate share of property taxes when he pays the same as the corporate farmer because he is less responsible for the deterioration of gravel roads. The family farmer also pays a vehicle tax on his trucks which are registered in the county. Corporate trucks, which are responsible for most of the gravel road maintenance expenses, are registered outside of the county. A more equitable tax structure would examine this reality and possibly also require all truckers who transport hogs to corporate integrators to pay a per/load road tax annually. As the population density per square mile declines, fewer family farmers are using gravel roads and still fewer of them are involved in the production of pork, especially at high numbers. As the number of hogs and pigs per square mile increases, more outside corporate truckers are taking advantage of county services.

The League of Cities and Association of Counties proposed tax policy would help with road repairs if corporate swine producers were no longer able to take the agriculture deduction when paying property taxes. Extending that deduction to local businesses would help them reinvest in their operations. It would recognize the restructuring of rural economics and provide for a slightly more equitable tax load. But the proposed revisions would have little to do with protecting the biophysical environment. A more equitable tax policy would recognize that the biophysical environment is also a cultural landscape. Currently, tax breaks are given for the development of businesses based on state legislature priorities. There are also tax breaks for the revitalization of commercial property. But there are no tax incentives for cultural landscape preservation, such as small scale diversified family farming, which is highly important to the preservation of the environment. In a more equitable agricultural tax structure, giving tax incentives for raising grass fed hogs, for example would be more effective in preventing environmental contamination than exempting manure pits from taxation. Further, a tax paid for spreading concentrated pit manure could help offset the costs to the public health fund and the Department of Natural Resources that result from monitoring wildlife habitat and treating contaminated drinking water supplies.¹³

Conclusion

Local variation can be observed in the effects of state legislature policies that promoted corporate industrial swine production in Iowa. These policies favored the attraction of external industrial capital over the retention of the rural entrepreneurial talent that stabilizes diverse rural community economies. In some areas, agricultural income was diminished as a result, and in other areas has increased the tax burden on local taxpayers. The transformation also diminished future economic opportunities resulting in out-migration of the rural labor force and a decline in rural businesses. In particular, the Master Matrix, a policy decision at the level of the State Legislature, has neither protected nor extended

the power of local decision makers to protect local interests as it was intended to do. Nor has it reduced conflicts between local interests and large external influences.

Tax policies that attract outside risk capital into agriculture prompt high risk business schemes (Dean and Carter 1962). Even though pork prices fluctuate greatly, some family farmers will sign on with integrators who promise profits based on volume. Others are willing to form limited liability corporations in hopes that current prices will be sustained long enough for calculated short term gains, anticipating that they can always sell out to larger integrators when the prices drop. They anticipate that short-term gains, often realized only through tax benefits, may also provide an opportunity for them to purchase additional farm land. The last thirty years of United States Department of Agriculture farm policies have taught them that managed risk can prevail over boom and bust cycles in agriculture. However, local farmers must balance the risks of short-term profits with the risks of long-term losses to their social relations with neighbors. This study shows that without local power to influence tax policies that protect family farms and community businesses, corporate industrial operations can gain a competitive edge in rural communities, placing local economies and the biophysical environment at risk.

The explosion of information and computer technologies makes it possible for environmental and socioeconomic data collection and analysis to improve political empowerment at local levels. The problems associated with large scale hog-confinement operations for local family farmers, natural resources, residential property owners, and taxpayers need not threaten Iowa's local economies, biophysical environments and social institutions if state level public policy is informed by local realities. Of course, those local realities can be expected to be contested.

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Notes

- ¹ The Manure Management Plan Form can be downloaded from the Iowa Department of Natural Resources web site at <http://www.iowadnr.com>.
- ² Bassett and Zimmerer (2003) call for more studies that focus on the developed world and how it contributes to environmental policy and management.
- ³ Iowa produces the most pigs in the nation with 15 million annually.
- ⁴ Data for Decision Makers, September 2002, Iowa State University Extension to Communities.
- ⁵ U.S. Census Bureau <http://www.iowadatacenter.org>.
- ⁶ See the Department of Natural Resources web site for details.
- ⁷ Iowa Select Farms <http://www.iowaselect.com/production/index.htm>
- ⁸ Interview with county employee.
- ⁹ See Iowa Department of Natural Resources.
- ¹⁰ See Iowa Department of Natural Resources.
- ¹¹ Its population of 8,000 support a hospital, liberal arts college, and Main Street retail enterprises.
- ¹² See Iowa Department of Natural Resources.
- ¹³ There are high rates of cancer in northeast Iowa.

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