

Chapter 7. Social and Community Impacts

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Introduction

The impacts of Concentrated Animal Feeding Operations (CAFOs) should be judged in terms of their socioeconomic impacts on rural Iowa and its communities as well as their impacts on human and animal health. Regulations and management practices should support socially and economically desirable community outcomes, as well as protect human and animal health. It is the role of government to select from among the regulatory options that contribute to economically viable, socially equitable, and environmentally sound communities (President's Council on Sustainable Development, 1996).

7.1 Quality of Life and Community Social Capital

Quality of life factors are emphasized in recent literature addressing the community impacts of CAFOs. The state of Minnesota recently brought together the scientific and public policy communities to advise state government on how to address several CAFO issues, resulting in a Generic Environmental Impact Statement (GEIS) for animal agriculture. It suggests, "Quality of life is related to perceptions of 1) having alternatives in what one does on a daily or life cycle basis, and 2) being respected by family and communities of interest and place." (Flora et al., 1999:A24).

An important aspect of community quality of life is social capital, which includes mutual trust, reciprocity, and shared norms and identity. In general, communities with greater social capital provide greater quality of life (Flora, 1998; Flora, Sharp, Flora, Newlon, 1997; Sharp, Agnitsch, Ryan, Flora, 2001). Also, social capital emerges as an internal resource in instances of controversies.

7.1.1 Agricultural Structure, Quality of Life, and Economic Vitality

Quality of life issues related to the structure and scale of agriculture were examined as early as the 1940's. More than half a century ago, Goldschmidt (1978; originally published in 1946) compared two rural California communities where the structure and size of farms were different, but where total value of farm production was almost identical. In the town where farms were larger and industrialized (with a higher proportion of absentee ownership and employing a higher proportion of farm workers per unit of output) there was greater separation of social classes, i.e. greater social inequality. More decisions about local affairs were made outside the community. This contrasted with the other community where farms were smaller, more likely to be owner operated, and utilized the labor of the operating family with some hired labor. This community had a richer civic and social fabric: residents of all social classes were more involved in community affairs, more community organizations served people of both middle and working class background, and there were more local businesses and more retail activity because more agricultural and consumer purchases were made locally and more income was in the hands of the classes with a greater propensity to spend. MacCannell, in a macro study that included family-farm and industrial-agricultural communities in 98 industrial-farm counties in California, Arizona, Texas, and Florida, found that mean farm size (in acres), gross farm sales, as well as high levels of mechanization "significantly predict declining community conditions not merely at the local agricultural community level, but in the entire county." (1988, p. 63.)

Recent studies, including those in the Midwest, reveal tendencies of economic decline in communities with greater concentration of CAFOs, similar to Goldschmidt's thesis of greater rural community decline with greater industrialization of agriculture. The econometric analysis conducted by Gomez and Zhang (2000) over a decade revealed the negative impact of swine CAFOs on economic growth in rural Illinois counties, as indicated

by sales tax receipts. They found that purchases from small businesses declined as concentration of CAFOs intensified. In a Michigan study, Abeles-Allison and Connor (1990) found that local purchases of supplies for swine production decrease as CAFO concentration increases. Local expenditures per hog were calculated at \$67 for the small farms and \$46 for the large farms. The difference is largely due to bulk feed purchases from outside the community by the larger farms, but is also related to somewhat greater total expenditures per hog on the smaller farms. Durrenberger and Thu's (1996) finding that increased food stamp utilization is associated with industrialized hog production in Iowa suggests either that industrial agriculture generates inequalities or that industrial agriculture thrives in counties with greater inequalities

Foltz, Jackson-Smith and Chen (2000) examined local purchasing patterns of large and small dairy farms in Wisconsin. They found that the percent of dairy feed purchased locally declined as herd size increased. Stronger indicators of local feed purchasing were the physical nearness to and social attachment to the community. In Minnesota, Chism and Levins (1994) found that local spending was not related to gross sales volume on *crop* farms. However, local farm-related expenditures fell sharply when the scale of livestock operations increased.

Otto, Swenson, and Lawrence (cited in Kliebenstein, 1998) found that local property tax revenues and state revenues in Iowa, calculated on a per sow basis, were as follows:

Table 7.1. Net Benefits And Net Revenues To Local And State Governments From Farrow To Finish Operations, Iowa

Size of operation	150 sows	300 sows	1,200 sows	3,400 sows
Net Local Government Benefit per sow	\$8.84	\$9.35	\$10.43	\$8.23
Net revenues to State Government per Sow	\$16.01	\$17.19	\$14.59	\$12.86
Sum of local and state revenues	\$24.85	26.54	\$25.02	\$21.09

Overall, more moderate-sized farrow-to-finish operations generated more local and state revenues per sow than did small or very large ones.

Quality of life issues that relate to agricultural structures are evident in Eastern North Carolina. This region experienced a tremendous growth in the hog industry beginning in the 1980's that includes both contract and corporate production facilities and meatpacking plants. Many citizens there perceive that this has left them with a power structure in which the interests of large pork producers dominate those of local residents at all levels of government (McMillan and Schulman, 2001; Thu and Durrenberger, 1994).

In North Carolina, Wing, Cole, and Grant (2000) have found patterns of disproportionate siting of corporate CAFOs in rural lower-income and African-American communities. This places residents of these communities at disproportionate risk for health and socioeconomic problems.

7.1.2 Quality of Life, Community Social Capital and Community Conflict

Wing and Wolf's (2000) study of 50-55 individuals from each of three North Carolina rural communities showed that quality of life was greatly diminished among who residents near a

6,000-head swine confinement operation, compared to residents near two intensive cattle operations or near an agricultural area without livestock operations that required liquid waste management. Quality of life was indicated by the number of times that neighbors could not open their windows or go outside even during nice weather due to CAFO odors.¹ Thirty percent of respondents from around the hog CAFO as compared to a maximum of three percent from the other two communities indicated that each of these problems had occurred 12 or more times during the past six months. Many rural residents comment that it is difficult to plan social activities in their homes because of the uncertainty of whether the air will be tolerable for guests (see Donham & Thu, 1996; Wright et al., 2001, pp. 28-30, for similar health and social responses near Minnesota CAFOs). Such limitations on social relations with one's neighbors indicate a decline in community social capital (Ryan, Terry, & Besser, 1995).

Lasley's Iowa Farm and Rural Life Poll (1998) shows substantial concern among Iowa farmers about hog odors. In the 1992 and 1998 polls, respondents were asked "how many days per year they would be willing to tolerate odors from a neighbor's livestock operation before they would consider it a major nuisance." Fourteen percent were unwilling to tolerate more than two days; 34% were willing to tolerate only a week or less, and fully 50% would view odors as a major nuisance if they affected them as many as ten days out of the year. The latter figure rose from 44% in 1992 (Lasley, 1995). Three-fourths of Iowa farmers live within half a mile of a neighbor. In addition the proportion of respondents agreeing with the statement, "Increasingly, manure management is a major issue in the livestock industry," rose from 61% to 85% of Iowa farm respondents between 1992 and 1998.

Characteristics of the nearest CAFO and of the affected neighbor influence the latter's level of annoyance with CAFO odors. Van Kleek and Bulley (1985), in a study conducted in the early 1980s in British Columbia, chose 14 swine farms, 14 beef feed lots, 11 laying hen farms, and 10 broiler farms located at least 800 meters (somewhat less than 1/2 mile) from any other livestock farm. A least 12 residences (non-producers of livestock) were within 800 meters of each livestock farm. Those residents rated their perception of the livestock farm "as it relates to your living here" on a five-point scale from "no nuisance/very compatible" to "severe nuisance/incompatible."

The authors found that nuisance potential decreased with distance, but it decreased the least for hog farms. Larger farms were a greater nuisance than smaller ones, but the difference disappeared for residences that were at very close ranges from the livestock farm. Hog farms were considered the greatest nuisance, followed by cattle feedlots and then by poultry CAFOs. Odor represented 75% of the total nuisance, but the proportion differed according to the type of farm; for hog farms, 95% of the nuisance responses related to odor; for broilers, 3/4; for layers, 2/3; and for feedlots, only about half. People with rural backgrounds were less tolerant of livestock farms than were those who had come from urban areas; those with farm backgrounds did not differ from those without farm backgrounds. Lohr (1996) found that among neighbors of a swine farm, tenure of residence, previous contact with the

¹ Miedema and Ham (1988) used an independent dispersion olfactometric testing method in a study designed to determine if specific complaints and symptoms from odors were indeed correlated with independent measurement of the presence of agricultural and industrial odors. Individuals living near a pig sty, a rapeseed oil extraction plant, and an electric wire insulation factory, were surveyed. Level of annoyance with the odor and reported frequency of having to shut windows because of the odor were linearly related to the frequency of detection of odor using the olfactometric test. Interestingly, the pattern of relation was not specific to the type of odor being measured.

farmer, and economic dependence on farming all negatively correlated with the degree of odor annoyance.

Debate continues, in popular and academic circles, on whether CAFO odors are best characterized as primarily nuisances of varying degrees or whether these odors are also linked to negative health outcomes (Thu, 1998). Donham (2000) describes possible non-toxic mechanisms for CAFO odors to generate physical symptoms through complex interactions of the brain and somatic systems. Shusterman (1992) describes some of these mechanisms in his review of the health impacts of environmental odor pollution. The well-researched linkage of physical symptoms to the uncontrollability of various stressors including environmental stressors (e.g., noise) may be applicable to CAFO odors as noted in Chapter 6.3. In addition, the variety of family, neighborhood, and community stressors sometimes associated with CAFOs may also generate stress-induced symptoms and illness. However, these possible linkages have not yet been reported.

All sides of CAFO controversies tend to frame their issues and identities in terms of rights and entitlements, as described in McMillan and Schulman's (2001) research on the hog industry in North Carolina. For example, producers defend their property rights and a right to earn a living from their land, while neighbors defend their right to enjoy their own property. De Lind (1995) documents that in response to local opposition to a corporate CAFO or "hog hotel" in Parma township in Michigan, the Farm Bureau, the Pork Producers Council, and other agricultural interests defended the right of "hog hotels" to exist without regulation by appealing to the right to farm.

Constance and Bonanno (1999) document actions of anti-CAFO groups in the Texas Panhandle. They focus on episodes of resistance carried out by local residents and environmental groups who were mainly motivated by human health and property value concerns. Corporate responses to community resistance primarily involved reconstruction of their corporate image as environmentally friendly.

A decline in social capital is associated with swine CAFOs, according to rural residents of Iowa, North Carolina, Minnesota, Michigan, and Missouri who describe violations of core rural values of honesty, respect, and reciprocity, as reported in an interdisciplinary workshop held in Iowa on swine CAFOs (Thu et al., 1995, p. 76). For example, CAFO neighbors often consider it a violation of respect when their concerns are labeled as emotional, perceptual, and subjective or are dismissed as invalid or unscientific.

Recent findings are presented by Kleiner, Rikoon and Seipel (2000), who found that in two northern Missouri counties where large-scale corporately owned swine CAFOs are dominant, citizens expressed more negative attitudes regarding trust, neighborliness, community division, networks of acquaintanceship, democratic values, and community involvement. The county that was dominated by independently owned swine operations had the most positive attitudes regarding trust, neighborliness, community division and networks of acquaintanceship.

The siting of a swine confinement facility in Parma, Michigan in the mid-80s (DeLind 1995, 1998) generated conflict when the firm established a five-unit CAFO with manure lagoons. Neighbors believed the three open-air 42 million gallon lagoons compromised their health and quality of life. Local resistance culminated in the emergence of two grassroots organizations and a four-year litigation process. Consequences of this conflict were anger on the part of residents who believed that their environment and their integrity had been

violated, resentment towards public officials, polarization within the community, vandalism, alienation, and verbal threats and physical aggression by both sides. Although the opponents of the CAFO won the battle on the local level (the CAFO went bankrupt), when they were interviewed a few years later, they felt the personal acrimony and divisions in the community resulting from conflict over the smell from the lagoons were too high a price to pay.

Wright et al. (2001) reported results from a six-county study in southern Minnesota regarding changes in animal agriculture. Over one hundred producers, community leaders, and others were interviewed, either in roundtable discussions or individually. Three patterns reflect the decline of social capital that resulted from the siting of CAFOs in all six rural communities: 1) widening gaps between farmers who produce livestock within CAFOs and their neighbors, including non-CAFO livestock producers; 2) harassment of vocal opponents of CAFOs; and 3) perceptions by both CAFO supporters and opponents of hostility, neglect or inattention by public institutions that resulted in perpetuation of an adversarial and inequitable community climate.

The North Central Regional Center for Rural Development (1999) examined recent, dramatic increases in corporate hog production and meatpacking in a rural Oklahoma county. Social capital indicators measured mutual trust, reciprocity, and shared norms and identity. Individual security was measured in terms of crime, and community conflict was measured in terms of civil court cases. The overall crime rate increased dramatically between 1990 and 1997. Violent crimes increased 378 percent compared to the average 29 percent decrease in violent crimes over the same period in comparison farming-dependent counties with no dramatic changes in animal agriculture. Theft-related crimes also increased in the case county by 64 percent, compared to a decrease of 11 percent in comparison counties. Civil court cases, indicating community conflict, increased in the county by 7 percent, while they decreased 11 percent in comparison counties. This study dramatically reveals the costs to social capital in counties experiencing rapid and dramatic change in the structure of animal agriculture.

7.2 Agricultural Restructuring and Population Trends

The primary purpose of this section is to provide background for partially answering Director Vonk's question 4: "What do you think should be done to address any other emerging issues with respect to industrial CAFOs in Iowa?" It is useful to begin with a discussion of rural population patterns in Iowa since the beginning of WWII. That is followed by an examination of recent changes in the structure of animal agriculture (and crop agriculture insofar as it interacts with animal agriculture) and how public policy relates to those changes. The general trends in livestock and poultry production are presented in Chapter 2.

7.2.1 Rural Population Dynamics since WWII

Agricultural restructuring since the initiation of WWII transformed the landscape of rural Iowa. As a result, Iowa's rural population generally has decreased across the decades. Using a definition of rural as an incorporated place with fewer than 2,500 residents plus those who live on farms or in the open country, Iowa had about 1,454,000 rural residents in 1940 and 1,094,000 in 1990. Although final figures are not available from the 2000 census, it appears that a slight increase occurred in Iowa's rural population in the 1990s. Major differences have emerged among three sectors—residents of farms, small towns, and the country. The

first of these dropped substantially², the second remained much the same³, and the third grew substantially⁴ across the decades.

Small towns tend to have the oldest age structure of the three types; that is, that have proportionately greater numbers of older and fewer numbers of younger residents than do the farm or country categories. This is because many older residents do not move in later life (or if they do change residences, they move from the countryside to nearby towns) and many high school graduates seek urban-based educational and occupational opportunities. This loss of youth is later magnified as they form families elsewhere. The farm population approaches a pyramidal shape, in part because many older residents move from the farm in later life; some others stay on the farmstead but no longer operate the farm (which may be absorbed into a neighbor's farm operation). Of the three groups of rural residents, the country population most closely approaches the classical pyramidal age structure. It includes younger residents with children. Country residents often are newcomers to the area; they may have perspectives that differ from those held by long-term residents. It is not easy to categorize country residents because of their more diverse origins and backgrounds.

7.2.2 Restructuring of Livestock Production in the Past Decade

Until the past decade or so, the industrialization of farm production had largely bypassed Iowa, with the exception of the fat cattle industry, which had its heyday in Iowa in the 1950s and 1960s (see Table 2.9 in this report). In the 1990s, Iowa hog and poultry (particularly egg) production were transformed (see Chapter 2, Table 3 of this volume). Furthermore, different types of animal production systems may generate different socioeconomic impacts at the level of the farm and community. Farmers, rural residents, and others express concern that increasing CAFO production is having negative impacts on the traditional family farm structure (e.g., Halverson, 2000). Buttel and Jackson-Smith (1997) surveyed 1,100 randomly selected Wisconsin farmers in 1995 and repeated the survey with 1400 farmers in 1999 (Jackson-Smith, et al., 2000) regarding their views toward large-scale livestock production. Only 17 percent of the respondents perceived expansion in the livestock industry as a good initiative, while 45 percent perceived it to be negative. Only 15 percent indicated that non-farm investors should invest in dairying in the local community (Buttel and Jackson-Smith, 1997). Results were similar in 1999.

Wisconsin farmers' views towards livestock expansion were not shaped primarily by concerns about the environment but instead by concerns about farm structure in their state. Farmers' responses indicated strong support for family-scale operations as opposed to large-scale farms using hired labor-type and to investor-owned dairy operations.⁵ The authors

² Number of persons resident on farms has declined across many censuses. Since 1940, when 917,000 lived on farms, Iowa lost at least 120,000 farm people each decade to 1990, when 257,000 were counted, the most recent data available (the 2000 farm population will be released later in 2002). The number of farms in Iowa decreased from about 213,000 farms in 1940 to 91,000 in 1997.

³ Small towns (fewer than 2,500 inhabitants) contained about the same number of residents in 1990 (460,000) as they held in 1940 (471,000). From 1990 to 2000, 464 of the 829 towns with fewer than 2,500 residents in 1990 increased in size. Only among the smallest-sized category—places with fewer than 100 residents in 1990—did a majority of towns decline in population.

⁴ About 66,000 country residents were counted in 1940 and 377,000 in 1990. In 1990, for the first time, country residents outnumbered farm residents in Iowa. Strong increases among country residents have occurred in each decade for which data are available. Gains among country residents tended to occur across counties regardless of the trends among farm or small-town residents.

⁵ The Iowa Farm and Rural Life Poll (Lasley 1999) has not asked questions that get as directly to views of the structure of agriculture, but they appear to hold similar views. In the 1999 poll, over half of farmers

concluded that the bulk of the farmers who oppose livestock expansion do so because of a strong concern that it would erode the status of family farming in the state.

The increasing production of hogs through contract relationships, following that of poultry (Morrison, 1998), is becoming central to socioeconomic, health, and environmental concerns regarding CAFOs. One reason that agribusiness firms contract with producers, or contract with intermediary firms who subsequently contract with producers is to gain greater control over the production process (Welsh 1997), moving decision-making from the farm level to higher levels in the vertical system. Rarely do poultry growers own the birds they raise, and the pork industry appears to be moving in that direction (Morrison, 1998). Among major livestock production systems, cow-calf operations remain the most staunchly controlled at the farm-level.

In Kentucky the fulcrum of recent agricultural policy debate has been a proposed joint liability provision within state regulations. This provision would make corporations that retain ownership of animals (integrators) and the growers who raise animals jointly liable for resultant environmental damages or production facility closings. Burmeister (2000) suggests this joint liability provision reflects a societal attempt to control the social risk of changes in animal agriculture.

Research on the social/community impacts of different forms of contracting versus spot markets is scarce. For example, there has been no systematic research on animal producers who lose production contracts. Certain contract livestock producers are organizing to gain more regulatory and contractual protection (Hamilton, 1995; Roth, 1995). Whether such protection will generate substantial socioeconomic and environmental benefits to these producers and their communities may be measurable in the future.

Contract farming, while seen by some livestock growers as their best available option for remaining in farming, is problematic for others. In 1999, 70 percent of Iowa farmers favored greater regulation of contracts in farming (Lasley, 1999). Other alternatives should be encouraged—particularly ones that are compatible with changes in consumer demands and with environmental quality. A growing proportion of consumers are concerned about sub-therapeutic use of hormones (as discussed in the Executive Summary), humane treatment of animals⁶, and the health and well being of producers. The socioeconomic, health, and ecological benefits of sustainable methods of agricultural production, including pork production as described by Ikerd (1998), are gaining recognition. For example, Lyson and Barham's (1998) found evidence of greater sustainability of middle-size, family farm operations over large-scale, corporate farms. They used measures of profitability, decreased

responding strongly agreed with the statement, "There is too much economic power concentrated in a few large agribusiness firms, and when the "agreed" category, the proportion agreeing rises to nine in ten farmers. The percentage agreeing with the statement, "If things continue as they are now, in a few years farmers will be treated like employees on their own farms," was only modestly lower (46% and 85%, respectively).

⁶ In an unpublished survey conducted by the Animal Industry Foundation in 1989 nearly 80 percent of those polled supported current practices of farm animal treatment (cited in Ohlendorf, Jenkins and Tomazic, forthcoming). But in the same survey two-thirds of those polled were in favor of increased regulation of production practices. Following up on this data, Ohlendorf et al. asked more than 2,700 consumers whether they agreed or disagreed with the statement "I would be willing to pay more for meat if it meant more humane treatment of farm animals." While 23 percent of those surveyed were undecided, one-half of all respondents agreed with the statement. There is no significant variation in agreement with this more pro-animal attitude across economic classes. This is at odds with the prevalent notion that consumer concern is much more different socioeconomic groups would be willing to pay.

resource use, and stable or increasing farm numbers in a community (See also Lasley, Hoiberg, & Bultena, 1993).

Thus, it is not necessary that CAFOs be the only, or necessarily even the dominant, way in which livestock will be fattened or milk or eggs will be produced in the future. Perhaps, it would be more correct to say that public policy—the collective will—could lead animal production either toward a continued growth of CAFOs at the expense of all others, or toward more pluralistic production regimes—which would undoubtedly include CAFOs without their necessarily being the dominant form of production.

7.2.3 Market Restructuring

While the structure of livestock production is changing rapidly, so is the marketing structure. The most important shift in livestock marketing is the expansion of vertical integration and the potential of an alternative form, vertical coordination (see Tweeten & Flora, 2001, for a thorough treatment of this topic). Vertical *integration* occurs through a *supply chain*, while vertical *coordination* operates through a *value chain*. Table 7.2 indicates important differences between the two.

Supply chains are oriented by myriad decisions of many producers—usually in an atomized market or perhaps nudged by government supply-limitation (until 1996) or supply-encouraging (after 1996) incentives. Value chains respond to the demands of consumers. Increasingly supply chains have come to be vertically integrated, reducing the freedom of the farmer to make on-farm and marketing decisions. The poultry grower neither owns the birds, nor makes decisions about how they will be produced. S/he is required to market

Table 7.2 Comparison of Features of Supply Chains and Value Chains

SUPPLY CHAIN	VALUE CHAIN
Producer oriented	Consumer oriented
Supply driven	Demand driven
Emphasis on reducing costs	Emphasis on creating value
Focus on volume	Focus on quality
Undifferentiated commodity	Differentiated products
Source (of commodity) is anonymous	Product may be traced to specific producer (identity preservation)
Many independent decisions (particularly at producer level)	Few cascading decisions
Open entry of new producers	Entry of new producers is limited
Susceptible to vertical integration	Requires at least some vertical coordination

Table adapted from C. Flora, et al. (1999), who adapted it from Cook (1997) and Hughes (1998).

to the integrator, and cannot be certain of the price s/he will receive for growing the birds. This lack of market discovery is also becoming more common in hog and cattle marketing, as processors, who increasingly buy directly from the farmer, are not required to publicly disclose the prices they pay. In the poultry business, contracts are from year to year. If they are terminated, there may be little likelihood of finding another integrator to sell to, since generally only one or two poultry integrators is active in a particular locale (Bjerklie, 1995; Griffith 1993; Heffernan & Jenkins, 1983).

The processor has typically controlled vertical integration, but increasingly retailers⁷ are gaining the balance of power in the food supply chain. Vertical coordination has the potential to be more collaborative and decentralized. Value chains are more amenable to a team approach, since flexibility in production is essential if production is to respond to changing consumer preferences. Farmers have little power under vertical integration, while they may band together to control or share control through vertical coordination. Vertical coordination does not ensure farmer power, but it is certainly amenable to farmers collectively exercising that power—if they are willing to key their production on diverse consumer desires and to devise ways to shorten the supply chain (Tweeten & Flora, 2001). Of course, state and local governments and institutions of higher learning can be helpful with information and linkages, particularly if they address previous constraints to promoting sustainable agricultural practices (Lacy, 1993).

At present, hog production—though much more concentrated than it was a decade ago—is much less concentrated than is pork processing.⁸ Heffernan, Hendrickson, and Gronski, (1999) estimated that in 1998, the fifty largest producers controlled about one half of all marketed hogs, and only one of the top five producers had substantial presence in Iowa. Most states where corporate hog production predominates are states where large numbers of hogs were not produced previously or where farms are smaller and less prosperous. One author argues convincingly that broiler integrators chose to focus on the South precisely because small farmers often were underemployed and desperately needed additional income (Bjerklie, 1995). The degree to which integrated hog contracts in Iowa and other parts of the Midwest are favorable or unfavorable to farmers will depend on the overall vitality of the rural parts of those states. When growers have or perceive they have few other options, they are more likely to sign unfavorable contracts.

7.2.4 Impetus for Alternatives in Production, Processing, and Marketing

One means of preserving identity is through shortening the value chain—bringing producer and consumer closer together. Shortening the value chain is important for the development of alternative production systems. Reducing the steps between producer and consumer contributes to quality control. Trust can be substituted for costly inspection systems, and immediate and direct feedback will occur when quality is inadequate. In addition, quality may be redefined in unconventional ways. For instance, the consumer may be willing to forego cuts of meat in uniform and predictable sizes if s/he has assurance that sub-therapeutic hormones are not used, or that animals are treated humanely.

If this sounds like each farm family would do its own direct marketing (which often falls to the female partner in a producer family), it does not have to be. A critical piece is socializing the transaction costs involved in identity preservation and quality assurance. This can be accomplished through devising novel collaborative means of marketing and identity preservation that are satisfying to the consumer, but which do not require each producer family to make its own marketing links or to individually organize its own system of quality assurance. Different kinds of producer-controlled or -influenced value chains, such as marketing cooperatives, joint ventures between corporate entities and producer associations, producer-consumer coalitions such as Community Supported Agriculture (CSA) groups

⁷ Between 1997 and 2000, the market share of the top five food retailers operating in the U.S. rose from 24% to 42%. Hendrickson, et al. (2001) argue that increasingly, market power is shifting from processors to food retail chains.

⁸ In 1998, the top four pork processors marketed 57% of all hogs in the country. The following year, according to the New York Times, the top six firms processed 75% of all market hogs. In 2001, the largest processor, Smithfield, bought IBP, which had ranked second in 1998 (Heffernan et al., 1999; 16)

(Cone & Myhre, 2000), or local marketing cooperatives (Ziegenhorn, 1998) can lift the marketing burden from the shoulders of individual producers.

Only with involvement of market (private for-profit firms, including family firms and farms), state (governments at different levels), and civil society (not-for-profit organizations, such as producer organizations, certification entities, etc.) can vertically coordinated value chains compete with vertical integration and supply chains. We often forget just how large a role various levels of government play in subsidizing commodity supply chains and vertically integrated firms within our food system (see North Central Regional Center for Rural Development, 1999: 6-20, for a detailed discussion of the “incentives” used to encourage Seaboard Corporation to build a pork packing plant in Guyman, OK).

Which of these factors may influence the future of the livestock industry in Iowa and how might they relate to odor regulation? Clearly, Iowa’s competitive advantage in grain and livestock production is an important element. Some argue that Iowa may regain market share in cattle and hog feeding that has recently been lost to the Great Plains (cattle) and to North Carolina (hogs), given Iowa’s competitive advantage in cheap grains. The 1996 Freedom to Farm Act, by dismantling price supports and the supply management system, encouraged production of corn and soybeans (Harl, 2001). Currently, low grain prices do not encourage farmers to shift to higher value crops, since loan deficiency payments increase as market prices decline. This has encouraged CAFO production in the Midwest where grain is cheap. It has also favored CAFO production over diversified family farming. CAFOs can purchase feed grains at market prices lower than costs to family farmers of feeding their own grain, since market prices have recently been below cost of production for family farmers.

Another important factor is the differential contribution of environmental protection to the cost of production by region. All other things equal, the more dense the human population, the greater the cost of environmental protection to the producer—if there are mechanisms for internalizing those costs, rather than their being paid by the society at large. The initial moratorium on building new hog CAFOs in North Carolina and its recent extension suggest that hog odors and water contamination can provide the political impetus for internalizing these costs in heavily populated areas. Should the Environmental Protection Agency increase the amount of land that is required for disposal of manure because of concern about excess phosphorus application, production in Iowa would be favored over North Carolina, although Iowa might be disadvantaged vis-a-vis the Great Plains.

Policy makers’ consideration of alternative means of regulating odors must take into account which farmers are disadvantaged by the regulations and what those regulations may mean in terms of encouraging certain desired futures for rural Iowa—and Iowa in general.

In this section we have provided evidence that industrialized commodity production and corporate controlled supply chains are not the only alternative. Regulation of odors and other airborne products should take into account various options, and encourage those that are more socially desirable.

7.3 Changes in Property Values

In the next section we consider changes in animal agriculture as they relate to the final form of community capital - financial capital. Several studies examine effects of nearness to a CAFO on real estate values. Abeles-Allison and Conner (1990) chose eight Michigan hog CAFOs and then examined residential sales within a five-mile square block centered on each CAFO. They analyzed data on 288 sales between 1986 and 1989. For every thousand hogs added in the five-mile area, they found an average drop in sale price of \$430 per property. The depression of sale price was much greater when the residential property was less than 1.6 miles away from the respective hog farm. Using state-wide data, they found, for the first half of 1989, that odor complaints were 50 times more likely to be lodged against any particular hog CAFO of over 500 head than against smaller hog operations.

Palmquist, Roka, and Vukina (1997) studied residential property values close to hog CAFOs in North Carolina. Controlling for other characteristics of the property, they examined patterns of non-farm home sales prices (n=237) over an 18-month period in 1992 and 1993. They found that nearness to large hog CAFOs and the amount of nearby manure jointly acted as a significant depressor of sales prices of up to nine percent, depending on the number of hogs and their distance from the house. Phillips et al. (1999), suggest that odors cannot be separated from other local effects from CAFOs that could also depress sales prices. These could be noise, dust from trucks, or a general decline in the natural beauty of the area.

Hamed, Johnson, and Miller (1999) found that an average vacant parcel within three miles of a CAFO in Missouri lost about 6.6% in value, but if a parcel with a house on it was within 1/10 mile of the CAFO, it lost 88% of its value!

Finally, Taff, et al., (1996) examined housing sale prices in two counties of southwestern Minnesota. The measures used to indicate feedlot proximity included distance, total animal units within a defined distance, and whether the home was downwind from any feedlots. Feedlot proximity was associated with *higher* sales prices. The authors suggest that perhaps workers desired to live close to their work.

7.4 Impact on Social and Health Services

While not examined here, studies of broader changes taking place in agriculture link housing, public services, natural resources and land use, and historical and cultural resources to the changing structure of animal agriculture. These changes are also reflected in the examples related specifically to animal agriculture.

NCRCRD research in Oklahoma (1999) found that housing rental rates increased nearly 85 percent over seven years in the county where production and meatpacking expansion occurred, compared to a 61 percent increase in comparison counties. At the same time, the influx of new workers resulted in a 47 percent decrease in housing availability. The combined result is overcrowding and shared housing situations, or a commute to neighboring counties with available and more affordable housing. These commuting costs add to the household costs of workers. Of course, the housing industry, among others, benefits from such growth.

The same research notes important implications for local educational systems. While total school enrollment increased 12 percent, resulting in construction of a new elementary school, there was a 125 percent increase in the number of bilingual or limited English speaking students. Despite an 81 percent increase in the county school budget between 1990

and 1997, both dropout rates and student/teacher ratios increased. Community costs due to increased demand on services, such as court costs from increased criminal and civil cases; law enforcement costs, and applications for public assistance and food stamps were also noted.

Other research points to additional costs of large-scale animal production to community resources: impacts on tourism and recreation due to livestock odors (McMillan & Schulman 2001); deterioration of bridges and hard surface roads (Constance 2000); and significant changes in rural landscapes and the number and condition of farm sites (Bowen 2000).

In 1990, the minority population accounted for about 4 of every 100 Iowans (4.1%); by 2000, that figure had increased to more than 7 of every 100 (7.4%). The minority population grew by 103,000 while the (white non-Hispanic) majority increased by 47,000 during the 1990s. For the first time, a significant portion of that growth in minority population occurred outside Iowa's metropolitan areas. These new Iowans were mainly attracted by jobs in meatpacking, and secondarily, in plant nurseries, construction, and certain low-wage service jobs.

While we were unable to find data on the extent of employment of immigrants and other minority groups in CAFOs in Iowa, it is clearer that industrial agriculture (packing plants in particular) employs a growing number of new residents who are culturally different from the long-term residents of rural Iowa (see Grey, 1997, 1998). Turnover in packing plant employment and hence in population (rather than presence of minority groups, per se) contributes to a number of social problems and a need for more local services, but it also brings in young, hard working, entrepreneurial (especially immigrant) families, shoring up the base of population pyramids and offering a larger working age population for years to come in certain communities that before the 1990s were aging steadily. Whether long-term residents and leadership in these communities will see these new residents as a gift or as a threat is still to be seen.

7.5 Concluding Remarks

Generally, Iowa's rural areas have had more difficulty holding their populations than have urban sections of the state. With more deaths than births⁹ and greater out- than in-migration, some of these counties have had problems sustaining their populations. The encouraging news is that the only decade in the 20th century during which Iowa had more people enter than leave was the 1990s; net in-migration totaled about 50,000. Even in that case, however, 43 of Iowa's 99 counties had more residents leaving than entering in the 1990s. Although there were some major exceptions, rural counties were more frequently listed among those 43 with net out-migration than were urban counties.

If this migration turnaround is to be sustained, additional attention needs to be given to issues of quality of life. That means that the physical environment, the quality and diversity of services (particularly health and educational services), and employment opportunities will need attention. If jobs are not available, it is unlikely that others will move to the area unless

⁹ In 2000, 48 counties had more deaths than births (called net natural decrease) and most were rural; only a few had an incorporated place with at least 10,000 residents. Due to the out-migration of younger people from many rural counties and the tendency of older residents to age in place, a declining proportion of the population is in the reproductive age groups. Hence, in recent decades, the number of counties experiencing net natural decrease has gradually grown. In Iowa as a whole, however, about 100,000 more births than deaths occurred throughout the 1990s.

natural and social amenities provide the premium that would attract them. Some Iowa counties have physical environments (e.g., rivers, lakes, open space) that attract residents. At present, many of the people moving to such locales already live in the state. And natural amenities are likely to be magnets only for the somewhat more affluent. On the other hand, urban areas are much more likely to benefit from employment-related moves. But then the characteristics of jobs also are related to the residents that they attract; that is, the types of employment that become available dictate at least in part the characteristics of those who will move to an area. To attract residents to a rural area, then, requires the perception that such a move may raise the quality of life through improved employment opportunities, and increasingly, access to amenities—both natural and social.

Demographic changes have a number of implications for CAFOs and vice versa. While in the 50 years between 1940 and 1990, the farm population dropped at about twice the rate that the (non-farm) country population increased, many residences remain close to livestock operations (Lasley, 1998). Since it appears that for the past decade the gap between farm population decline and the country population may be closing, hog, and perhaps poultry, CAFO odors will be a growing issue among rural dwellers.

A related issue that is suggested by the demographic patterns is the potential conflict that CAFOs and industrial agriculture generate between employment and amenities. Those communities where odors and health problems from CAFOs remain or become an issue may have a more difficult time attracting or holding population that would otherwise come because of rural communities being “a good place to live and raise a family.” The amenity scale may go down not simply because of these problems themselves, but because the odor and health issues generates conflict, reducing social capital and the ability of the community to act collectively to enhance local social and natural amenities. Resolving these questions through alternative livestock production methods may make it easier for communities to encourage employment *and* to increase amenities. For example, a 2001 informal survey of 13 Iowa State University Extension livestock specialists (Honeyman et al., 2001) documented the existence of at least 2100 hoop structures in Iowa, which, with appropriate management practices, can be more environmentally friendly than CAFOs. In conjunction with appropriate marketing structures, other ecological production regimes, such as use of A-frames and rotational pasturing may be feasible.

A final set of demographic issues surrounds the health risks and desires for justice expressed by elderly rural residents residing near CAFOs. They often express concern about being at risk for respiratory problems, as well as concern that antibiotic treatments may fail them when needed. The siting of CAFOs near the rural elderly, who are less likely to move in the later years, seems inequitable to some, as does the decline in quality of life for those who have worked productively for many years, including in support of others in their communities.

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