County-Level Impact of Pork Production and Processing in North Carolina

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Eighty-five of the 100 counties in North Carolina are rural (Figure 1). Employment opportunities and incomes in the rural counties are lower than those in urban counties. The state is making a concerted effort to increase rural economic development and income. One component of this effort is the encouragement of rural businesses and industries, some of which produce livestock such as poultry and hogs. The hog industry has grown substantially in North Carolina, which is now the second-largest hog-producing state in the United States. Production of hogs in the state is mostly industrialized and concentrated in a few counties. Industrial-scale hog production is often associated with environmental problems, but some argue that the job opportunities provided by the hog industry offset the costs of environmental degradation.

The impact of industrial farms on rural communities is often mixed. Small farms generally cannot compete with industrial farms, and a common result is the absorption or elimination of these farms. As industrial farms become established in an area, there is often an initial increase in economic activity and jobs primarily due to an increase in farming and related activities. But many of these jobs pay low wages and provide little opportunity for advancement or development of managerial and other skills necessary for successful industrial-farm operations. As a result, much of the benefit (financial and otherwise) from the industrial farm does not reach local residents. This often results in a loss of power by the local community. Even communities that are thriving under industrial agriculture could falter if economic conditions change. Because industrial farms are mostly investments on a quest for higher returns, communities become vulnerable to the possibility of the industrial farm moving to other communities with friendlier environmental regulations and lower input costs.

In North Carolina, the industrialization of livestock production has created environmental problems due to excessive hog waste. Adequate disposal of animal waste is a major problem. Current methods such as collecting animal waste in holding ponds and lagoons have consistently failed to resolve the associated environmental problems, especially on large confined animal feeding operations (CAFOs). This continues to threaten the water supply. In addition, odors from these lagoons are offensive to both nearby residents and visitors. Vukina, Roka, and Palmquist (1996) noted that it is difficult to bring the cost of odor reduction in line with its benefits because information is lacking on what constitutes a tolerable odor level. Even so, small communities tend to pay more per-capita to preserve and upgrade their environment (Reeder 1995). Agricultural industrialization may provide economic opportunities for rural residents, but the associated environmental problems could decrease community wealth or equity if environmental problems result in substantial declines in real estate values or health status.

The recent flooding that accompanied Hurricane Floyd served to underscore the danger that concentrated animal farming poses to environmentally sensitive parts of the state. The flooding occurred in the eastern part of North Carolina and caused the contamination of water supplies from animal wastes. These types of environmental problems tend to be localized, especially in rural communities where most hogs are produced. In 1995, 11 of the state's 100 counties produced about 75 percent of the 8.2 million hogs in the state (1996 North Carolina Agricultural Statistics). Duplin and Sampson Counties alone accounted for about 43 percent of all hogs and pigs produced in the state. Likewise, 10 counties produced 65 percent of all broilers in the state during the same year, and five of these ten counties produced 48 percent of the broiler crop. The inter-county distribution of turkey production indicates that more than 85 percent of the

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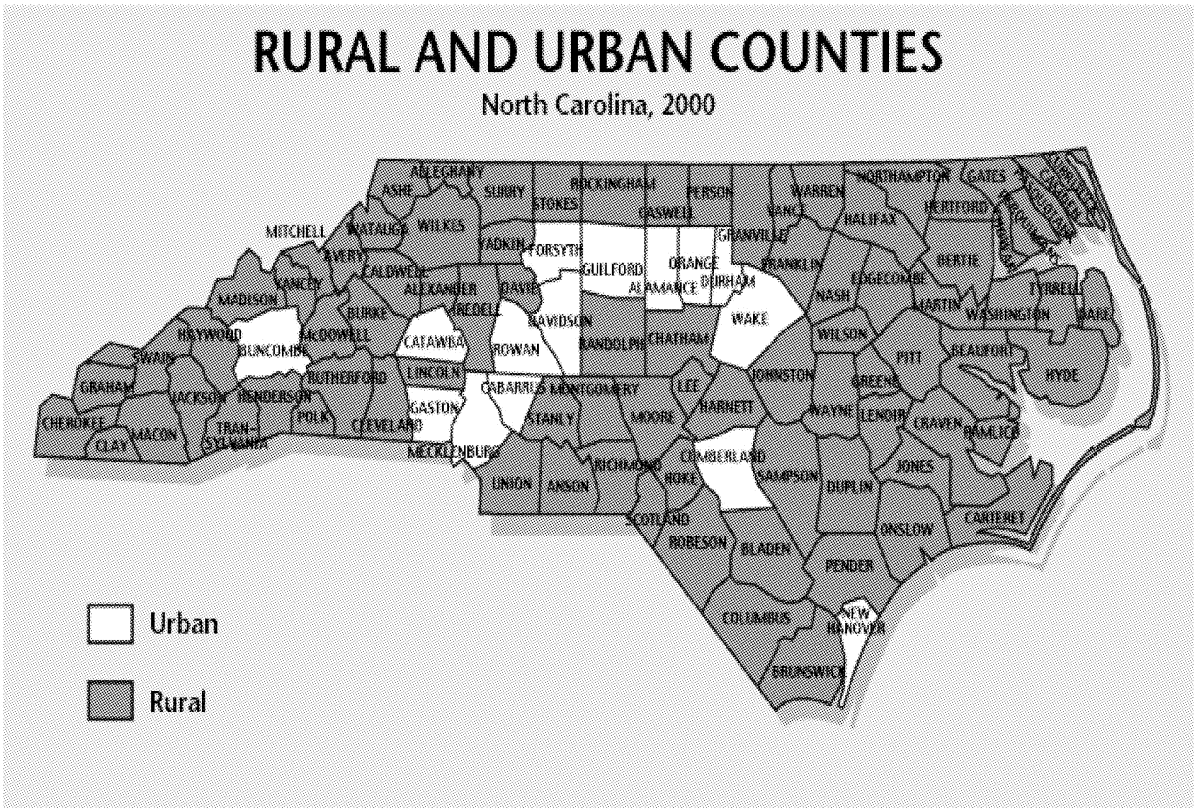

Figure 1: County Map of North Carolina.

Source: North Carolina Rural Development Center.

product came from 10 counties. Another problem associated with hog production and processing is worker safety. Integration of livestock production and processing has provided some jobs for rural residents, but these new jobs may come at the expense of adequate working conditions. This was best exemplified by a fire in a poultry-processing plant in Hamlet, North Carolina during which many workers were injured, some fatally.

Environmental problems could also crowd out or deter other industries from locating in a community, thereby preventing a diversification of the economic base. This could result in noncompetitive labor markets where limited employment opportunities could provide a basis for unfair labor practices. Research is necessary to help rural communities identify, better understand, and cope with the impacts of industrialized hog production. To identify these impacts and help define policy options, it is necessary to evaluate and understand the county-level socio-economic implications of industrialized hog production. This study assesses the spatial distribution of hog production and the county-level impact of North Carolina's hog industry on some indicators of welfare such as employment, income, population changes, and number of business establishments.

Previous Work

Some studies (Tweeten 1998; Powers 1995; Flora 1995) regard agricultural industrialization as the inevitable progression of human economic activity that started with farming and brought about the green revolution. In this context, agricultural industrialization is mostly viewed as socially beneficial. Other studies have found that rural communities are adversely impacted by such industrialization. Goldschmidt (1978) compared two rural communities in the San Joaquin Valley of California and found that, compared to the community with large farms, the community with smaller farms had more business establishments, more retail trade, a higher average standard of living, more owners, and fewer laborers. Powers (1995) helped put these findings

in perspective by observing that the culture and ethnicity of the people in a community may be a major determinant of how they view the changes and impacts on them, their families, and their communities. Because the impact of agricultural industrialization may be community-specific, it is necessary to evaluate how some counties in North Carolina may have been affected by the process.

Procedure

Data on county-level hog production was obtained for each county in North Carolina from the 1987 and 2002 Census of Agriculture. The corresponding county-level data on employment, population, income, and number of businesses was also collected for each of the two census years. The percentage change in the number of hogs was calculated for each county and used to rank the counties in order of increase in hog production. The ranking was used to select the 25 counties with the highest percentage increases in hog production during 1987–2002. The mean percentage changes for these counties were calculated and used to compare the mean change for the state as a whole. The mean growth in income, employment, population, and new businesses for the top 25 counties were also compared with the state averages.

Results

The 25 counties with the highest percentage change in hog production during 1987–2002 are presented in Table 1. The average number of hogs produced in these counties is 331,177, which is more than three times the state average of 98,874. Duplin County produced 2,166,185 hogs in 2002, the highest number among the group. Warren County came in a close second with 2,001,731 hogs. Bladen and Wayne Counties came in third and fourth, respectively, with 865,615 and 564,908 hogs. The lowest number of hogs, 179, was produced in Richmond County.

The percentage increases in hog production ranged from 202 to 3,678 percent. The highest increase during the study period was recorded in Bladen County, where hog production increased 3,678 percent over the fifteen-year period. The next three highest percentage increases were recorded in Jones, Pender, and Hoke Counties, where hog production grew by 2,764, 1,426, and 1,205 percent, respectively. Edgecombe and Harnet Counties, with 202 and 233 percent, respectively, had the lowest increases over the study period. The average change in hog production in the 25 counties was 723 percent, which is more than 2.5 times the 288-percent change recorded for the entire state.

The above average increases in hog production did not seem to translate to similar increases in employment, income, number of business establishments, and population. During the study period the number of people employed in the state increased by 24 percent per county, which is ten points higher than the 14-percent average for the 25 counties with the highest percentage increases in hog production (Table 2). However, the 95-percent change in per-capita income for the 25 counties is slightly higher than the 93-percent change recorded for the entire state. The average county in North Carolina had a 28-percent increase in the number of business establishments, which is higher than the 17 percent averaged by the top 25 counties. The change in population also followed a similar trend, with the 25 counties averaging a 19-percent increase, below the state average of 30 percent. The increase in the number of hogs per square mile for the top 25 counties is 331 percent and is 14-percent higher than the 290-percent average increase for all the counties in the state.

Conclusions

Hog production in North Carolina is mostly concentrated in a few counties. These counties accounted for most of the growth in the industry over the 15-year period from 1987 to 2002. Relative to the average county in the state, the dramatic increases in hog production have not resulted in business, employment, and income growth for the counties. Per-capita income was only slightly above the state average, while business, employment, and population growth were below the state averages. This suggests that any adverse environmental impact of the industry in these counties is a net negative. These findings also suggest a need to reconsider the dependence on the hog industry as a rural development strategy.

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Table 1. Ranking of 25 North Carolina Counties with the Highest Percent Change in Hog Production, 1987–2002.

County	2002 hog count	% change from 1987	Rank by % change
Bladen	865,615	3,678	1
Jones	269,794	2,764	2
Pender	289,573	1,426	3
Hoke	81,403	1,205	4
Anson	63,408	876	5
Columbus	255,732	812	6
Duplin	2,166,185	686	7
Robeson	396,921	517	8
Wayne	564,908	514	9
Rockingham	5,629	509	10
Brunswick	75,195	505	11
Hertford	54,422	433	12
Scotland	140,000	419	13
Yancey	179	411	14
Richmond	53,961	402	15
Lenoir	274,844	401	16
Surry	20,309	368	17
Sampson	2,001,731	344	18
Warren	40,574	291	19
Cumberland	113,526	290	20
Caldwell	2,100	274	21
Northampton	129,277	270	22
Onslow	190,960	239	23
Harnett	75,145	233	24
Edgecombe	148,042	202	25
Top 25 Average	331,177	723	-
State Average	98,874	288	-

Table 2. Mean County-Level Changes in Employment, Income, Number of Business Establishments, Population and Hogs per Square Mile in the 25 Counties with the Largest Percentage Gains in Hog Production.

Variable	Average for top 25 counties	State average
Hogs	723	288
Employment	14	24
Per-capita income	95	93
Number of businesses	17	28
Population	19	30
Hogs/square mile	331	290

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