Socioeconomic Impacts of Agricultural Processing Plants

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Expanded processing of agricultural products has been widely pursued as a strategy for rural economic development. However, the expansion of value-added agricultural processing in rural areas has not been without its problems. For example, some communities have found that new plants led to an influx of workers, many with racial/ethnic backgrounds different from those of long-term community residents. In interviews with community leaders and residents in four North Dakota communities with new processing plants, most felt the new plants led to improved job opportunities and enhanced incomes.

In recent years, many rural communities in the western Corn Belt and northern Great Plains have developed or attracted new agricultural processing facilities. This is generally seen as a positive development; cooperatively owned, value-added processing plants may allow farmers to share in profits from processing and marketing their products. Also, whether locally owned or part of a large, integrated agribusiness, new processing plants create jobs in rural areas hard hit by the 1980s farm crisis and subsequent farm consolidation. However, some host communities have found that the new plants offered more jobs than the local labor supply could fill and/or at wages lower than local workers would accept. An influx of newcomers, many with racial/ethnic backgrounds different from those of long-term community residents, has disrupted some communities. Local housing and public facilities may be strained by the influx of workers. Additional demands for public services and expanded infrastructure may pressure fiscal resources. Further, the nature of some agricultural processing operations may raise air and/or water quality concerns.

In North Dakota, agricultural processing has been a cornerstone of economic development efforts since 1979, when the State established an Agricultural Products Utilization Commission (APUC) to promote value-added agricultural processing. APUC has assisted in predevelopment financing for a number of agricultural processing initiatives, and has funded numerous feasibility studies. During the 1990s, several new facilities were developed to process the region's agricultural products, including durum wheat, corn, potatoes, and bison.

North Dakota's agricultural processing initiatives were based on the hope of new job opportunities for area residents, improved incomes for farmers and other area residents (e.g., through improved employment opportunities, opportunities to produce higher-value crops, and/or better prices/returns for existing crops), economic diversification for communities long dependent on production agriculture, population stability and reduced outmigration, improved local services (e.g., schools), and an enhanced tax base. This article examines several recently developed agricultural processing plants to determine how actual outcomes compared with initial hopes for nearby communities. The experiences of these communities are then compared with communities in other areas that have also seen agricultural processing expand.

Plants Process Agricultural Products of the Plains

Each of the four projects studied was the result of substantial development efforts over several years.

The Aviko USA plant is located just east of Jamestown (fig. 1). The plant, built in 1995-96 for $70 million, processes about 4.6 million

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Table 1

Recently initiated North Dakota agricultural processing projects

New plants represent substantial investment and employment

Project	Form of organization[1]	Date started		Initial investment	Operating employment		
		Construction	Operation		Initial[2]	1998[3]	Current
		Year		*$ million*		*Number*	
Aviko USA	IOF	1995	1996	70	160	220	260
Dakota Growers Pasta	C	1992	1993	43	100	275	275
North American Bison	C	1993	1994	1.6	20	46	50
ProGold	C	1995	1996	260	120	120	120

[1]C = cooperative, IOF = investor-oriented firm.
[2]Employment after 1 year of operation.
[3]As of third quarter, 1998.
Source: North Dakota Agricultural Processing Survey.

hundredweight (cwt) of potatoes annually into frozen french fries and employs about 260 people. Aviko is one of the largest frozen potato processors in Europe.

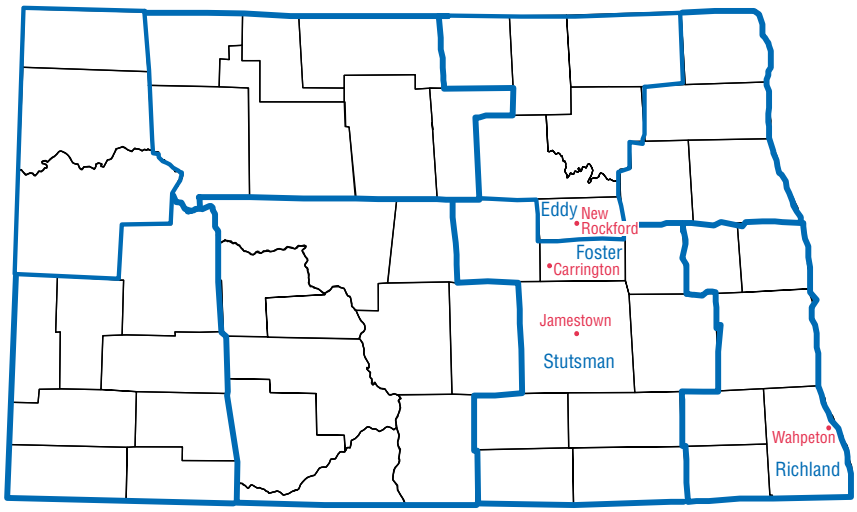
Dakota Growers Pasta, in Carrington (fig. 1), processes durum wheat into a variety of pasta products (e.g., spaghetti, macaroni, noodles). The plant is organized as a closed cooperative; in 1992, 1,040 durum growers purchased 3.1 million shares of equity stock at $3.90 per share, raising more than $12 million for the project. Each farmer received delivery rights to one bushel of durum wheat per share (i.e., they had both the right and the obligation to deliver the grain for processing annually). Plant construction began in 1992, and production began in 1993. In 1998, Dakota Growers had 1,084 durum growers as members, with about 96 percent North Dakotans and the remainder in Minnesota and Montana. Dakota Growers is now the third-largest producer of dry pasta in North America. The plant employs about 275 workers (table 1).

The North American Bison Cooperative (NABC) was formed in 1993 by a group of bison ranchers to build and operate a modern, efficient processing plant; 182 bison growers purchased equity shares at $250 per share (one share = one bison delivered annually). Construction of the $1.6 million plant began later in 1993 and was completed in 1994. The plant, located just south of New Rockford (fig. 1), initially employed 20 workers. Plant capacity was expanded in 1996 and again in 1998; the cooperative currently employs about 50 workers and processes more than 10,000 bison annually.

The ProGold corn wet milling project was undertaken by farmers in the southern Red River Valley of North Dakota-Minnesota. In 1994,

Figure 1

Study Communities and Counties



more than 2,000 farmers subscribed to more than 15 million equity shares (each priced at $3.35 and representing a commitment to deliver 1 bushel of corn annually) in the new cooperative, thus committing more than $50 million of equity. The project was granted special tax concessions (extended local property tax abatements and State sales tax exemptions on equipment and machinery installed in the plant) by a special session of the North Dakota Legislature. Construction of the $260 million facility began in 1995 on a site near Wahpeton (fig. 1) and was completed in the fall of 1996; at the peak of construction activity, about 1,200 workers were employed.

The plant produced its first commercial-quality high-fructose corn syrup (HFCS) in December 1996 and was fully operational early in 1997. While the project was completed on schedule and within budget, the plant had difficulty marketing its corn sweeteners because of overcapacity in the HFCS industry, and the grower co-op sustained a net loss of $11.7 million in fiscal year 1997. To reduce losses and improve the likelihood of future dividends to members, ProGold management negotiated an agreement to lease the plant to Cargill, Inc., effective November 1997. Since the lease went into effect, the plant has been operating with stable employment—about 120 employees (table 1). The plant has the capacity to grind about 85,000 bushels of corn per day, producing corn sweeteners, corn-based feed ingredients, and corn germ.

Site Communities Had Suffered Economic and Population Decline

The site communities represent a cross-section of the nonmetro trade centers in eastern and central North Dakota. With 1998 populations ranging from 14,700 (Jamestown) to 1,500 (New Rockford), these towns have traditionally served as trade centers for areas whose principal industry is agriculture (table 2). All four communities experienced population declines during the 1980s, which can be largely attributed to that decade's farm crisis and ongoing farm consolidation. All four towns suffered decreases in their inflation-adjusted taxable sales and purchases during the 1980s, ranging from 7 percent (Wahpeton) to 64 percent (New Rockford). Thus, these communities entered the 1990s with a dire need for economic revitalization.

Plants Stabilize Local Economy and Population

Leaders interviewed in each of the communities with new processing plants cited improved job opportunities and enhanced incomes as major positive effects. Aside from some management and

Table 2
Population and adjusted taxable sales for agricultural processing site communities, 1980 and 1990-98
Population and sales were stable or declining in site communities

Item	City			
	Carrington	Jamestown	New Rockford	Wahpeton
Population:			*Number*	
1980	2,641	16,280	1,791	9,064
1990	2,267	15,571	1,604	8,751
1996	2,163	14,983	1,525	9,039
1998	2,111	14,713	1,497	9,322
Change:			*Percent*	
1980-90	-14.2	-4.4	-10.4	-3.5
1990-98	-6.9	-5.5	-6.7	6.5
1996-98	-2.4	-1.8	-1.8	3.1
Adjusted taxable sales and purchases:			*Thousands of 1997 dollars*	
1980	39,751	174,720	17,217	72,789
1990	25,106	134,997	6,237	67,967
1996	31,075	150,950	6,270	79,732
1998	29,121	159,114	6,092	76,408
Change:			*Percent*	
1980-90	-36.8	-22.7	-63.8	-6.6
1990-98	16.0	17.9	-2.3	12.4
1996-98	-6.3	5.4	-2.8	-4.2

Source: Calculated by authors from Census Bureau and ND State Tax Department data.

engineering positions, most of the plant jobs went to area workers rather than inmigrants. Residents' incomes were boosted both by the plants' payroll (which often represented second incomes for area households) and by increased incomes for area farmers. Dakota Growers Pasta, for example, was credited with adding $1 per bushel (25 percent or more) to producers' returns.

In all communities, the additional job opportunities resulted in an increased demand for housing, increased occupancy of vacant units, and sometimes a perceived local housing shortage.

The new plants did not lead to substantial inmigration or major population growth in the host communities because most of the plant jobs were taken by area residents. Plant workers who did move to the area were seen by local leaders as offsetting the long-term population decline and stabilizing the local economy. During 1996-98, three of the four site communities reverted to decreases in population, and three of the four showed declining retail sales, likely due to the depressed state of the region's agricultural economy overall.

The plants' effects on infrastructure and service needs were substantial for the two smaller communities (New Rockford and Carrington), but less so in Jamestown and Wahpeton, where the agricultural processing plant was among several expanding employers. (Here it was sometimes difficult to separate the effects of the agricultural processing plant from the effects of growth in manufacturing sector employment generally.) In all communities, the additional job opportunities resulted in an increased demand for housing, increased occupancy of vacant units, and sometimes a perceived local housing shortage. (Some respondents commented on the apparent inconsistency between housing shortages and stable or declining local populations. A regional demographic trend toward smaller households has likely increased the number of households in these communities even though population has declined.) Affordable housing units (that plant workers paid $9-$13/hour can afford) were generally believed to be in shortest supply.

Day care—its affordability and the need for extended hours—was reported to be affected by plant development and/or manufacturing growth in each community. Affordability relates to the challenge of meeting Federal and State requirements while keeping rates at levels that plant workers can afford. Extended hours were a special concern with respect to major employers that operate around the clock; most daycare facilities have schedules geared to the standard workday. However, two of the communities had attempted to offer day care for shift workers and determined that numbers were insufficient to support the service.

Demands on public services were mixed. Streets and roads were somewhat affected, with three of the four sites reporting additional expenditures to improve access roads to the plant. Increased road use by trucks delivering products and/or by workers was reported, but was generally not a serious concern. Fire and police protection were not seen as issues in most communities, although the 1,200 construction workers associated with the ProGold project led to some short-term policing issues. Those school-age children who came to the community served mainly to stabilize local enrollments during a period characterized by a declining school-age population across the State. Increased needs for special education services were reported by the two larger school districts, but respondents were not sure if this was due to a specific project, manufacturing growth in general, or societal changes. On the other hand, demands for social services had generally eased with the advent of plant-related job opportunities. In three of the four study communities, caseloads were reported to be down substantially over the past few years, and leaders credited improved job opportunities for the change.

Public expenditures and revenues were topics of interest for both leaders and residents of the affected communities. Each project had committed some public resources, generally provision of a plant site and some services, and each plant had received an abatement of local property taxes. The cost of providing services became a major issue only in Jamestown, where an expanded wastewater treatment facility ran over cost estimates and the city and company disagreed about the appropriate sharing of the costs. In Carrington and New Rockford, the resources committed were generally seen as appropriate in view of the plant's contribution to the community. In Wahpeton, the concern was not so much about the costs incurred but

Table 3
Community residents' assessment of positive effects of agricultural processing plants
North Dakota residents see jobs and income as plant benefits

Attribute	Community				
	Carrington	Jamestown	New Rockford	Wahpeton	Total
	Percent who rated effect as positive or very positive				
Job opportunities	93.1	84.6	90.0	72.5	84.9*
Residents' incomes	61.8	51.3	61.2	43.7	54.4
Schools	59.8	30.8	29.5	25.2	35.3*
Quality of life	45.1	24.8	30.8	31.1	32.5
Local public revenues	38.2	37.6	32.6	16.7	31.0*

*Significant at the 1-percent level based on Chi Square test.
Source: North Dakota Agricultural Processing Survey.

that local benefits were less than anticipated, particularly in terms of population and retail sales growth.

The pros and cons of local tax abatements and other incentives were discussed in all the communities. A recurring theme was that these decisions should be based on an understanding of both short- and long-term implications for local government budgets, as well as the broader implications of having the facility in the community. School officials were sometimes apprehensive of tax abatement decisions that would affect their revenue base for years to come. On the other hand, county officials focused beyond the abatement period and cited the plant's long-term contribution to the local tax base. However, there was general agreement that local residents should be kept informed regarding the commitments being made to a project and the implications of those commitments.

Of all the plants' impacts, only air quality and water quality were rated more often as negative than positive by local residents. Objectionable odors were reported in connection with three of the four plants, although local leaders generally considered these to be minor issues. Water requirements were a pre-development concern with respect to two of the plants, while wastewater treatment became a major issue with one. These issues appear to have been resolved, but the inherent nature of some types of agricultural processing suggests that air and water quality are issues that need to be considered when such plants are proposed for development.

Residents Believe Plants Benefited Their Communities

Community residents were asked to rate the effects that the agricultural processing plant had on various aspects of their community (table 3). Almost 85 percent felt the effect on job opportunities was positive or very positive, ranging from 93 percent of Carrington (Dakota Growers Pasta) residents to

Table 4
Community residents' and leaders' assessment of positive and negative effects of agricultural processing plants
North Dakota leaders were more positive than residents about effects of agricultural processing plants

Attribute	Residents	Leaders	Residents	Leaders
	Percent positive or very positive		*Percent negative or very negative*	
Job opportunities	84.9	91.6	1.5	2.8
Residents' incomes	54.4	80.6	1.9	2.8
Schools	35.3	61.1	3.4	2.8
Quality of life	32.5	36.1	3.8	0.0
Local public revenues	31.0	77.8	14.5	11.1
Social organizations (churches, civic groups, etc.)	28.8	36.1	2.4	0.0
Child care/day care	28.1	42.8	5.2	2.9
Housing costs	26.7	50.0	20.3	19.4
Family life	23.8	25.0	3.0	0.0**
Local public expenditures	22.5	36.1	9.6	22.2*
Streets, roads, and highways	21.6	41.7	20.8	13.9
Fire protection	20.6	22.2	1.9	0.0
Police protection	16.0	22.2	3.4	0.0
Crime/public safety	9.6	5.6	8.6	8.3**
Air quality	6.8	8.3	24.0	19.5
Water quality	6.6	8.3	12.2	0.0

*Significant at the 1-percent level based on T test.
**Significant at the 10-percent level based on T test.
Source: North Dakota Agricultural Processing Survey.

73 percent of those in Wahpeton (ProGold corn wet milling). More than 54 percent felt that the plant development had a positive or very positive effect on community residents' incomes, ranging from 62 percent in Carrington to 44 percent in Wahpeton. Thirty percent or more of the residents cited schools (35 percent), quality of life (33 percent), and local public revenues (31 percent) as benefiting.

Among all residents, 24 percent felt that air quality had been negatively affected by the plants (table 4), followed by streets, roads, and highways at 21 percent, and housing costs at 20 percent. Of all the community aspects listed, only two (air quality and water quality) were more often rated as suffering than benefiting from agricultural processing plants.

Leaders Were More Positive Than Residents About Plant Effects

Community leaders gave higher marks than residents regarding plant effects on most community aspects. In particular, almost 78 percent of leaders, compared with 31 percent of residents, believed that local public revenues had been positively or very positively affected (table 4). Similarly, 81 percent of leaders (54 percent of residents) felt that residents' incomes had benefited, and 61 percent of leaders (35 percent of residents) felt that local schools had gained. Concerning negative effects, leaders were less upset than residents over water quality, but more concerned over the strain on local public expenditures.

Leaders may have rated the projects' effects more positively than residents because (1) leaders took a longer term view of some effects, and (2) leaders compared changes in their own communities with experiences of other rural communities around the State. For example, during interviews, several leaders commented on the major increase in the local property tax base that would occur as the tax abatements were phased out. Leaders also mentioned that, while their local school enrollments had been stable or declining slightly in recent years, similar communities without new plants had registered much greater declines.

Most community residents who expressed an opinion felt that the economic benefits of developing the agricultural processing facility in their community exceeded the costs (table 5). Approximately 47 percent of respondents overall indicated that economic benefits exceeded costs. Another 40 percent indicated they did not know if benefits exceeded costs; therefore, of those who expressed an opinion, 79 percent believed that economic benefits exceeded costs. Similarly, 34 percent of respondents overall (68 percent of those expressing an opinion) believed that the social benefits of plant development exceeded the social costs. If an election were held today, almost two-thirds of the residents agreed that most people in their community would vote in favor of the plant, and almost 72 percent would themselves vote in favor. The community leaders' responses to all of these questions were substantially more favorable to the plants than those of the residents (table 5).

Table 5
Community residents' and leaders' assessment of costs and benefits of agricultural processing plants
North Dakota leaders and residents agree that benefits exceed costs

Item	Residents	Leaders
	Percent	
Economic benefits to community exceeded costs:*		
Yes	47.1	83.3
Don't know	40.1	8.3
No	12.8	8.4
Social benefits to community exceeded costs:*		
Yes	34.0	75.0
Don't know	49.8	16.7
No	16.2	9.3
If an election were held, most people would vote in favor of agricultural processing plant:		
Somewhat or strongly agree	65.4	77.8
If an election were held, I would vote in favor of agricultural processing plant:**		
Somewhat or strongly agree	71.8	91.4

*Significant at the 1-percent level based on T test.
**Significant at the 10-percent level based on T test.
Source: North Dakota Agricultural Processing Survey.

Outcomes Compared With Expectations

Comparing actual outcomes with expectations shows that most of the anticipated benefits were in fact realized. Improved job opportunities and enhanced incomes were generally seen as major positive effects of each of the new processing plants. Residents' incomes were seen as being enhanced both by the plants' jobs and payroll (which often represented second incomes for area households) and by increased incomes for area farmers—either from dividends paid directly by the processing plants (Dakota Growers, NABC), or from higher prices for a crop already being produced (ProGold), or by allowing producers to raise a commodity that previously had no viable market (Aviko, NABC). Because most of the plant jobs were taken by persons already living in the area, the new plants did not lead to substantial inmigration or major population growth in the host communities, but rather served to stabilize the local economy and population (or to slow the rate of decline). Of all the effects of the plants, only air quality and water quality were more often rated as negative than positive by local residents.

Outcomes Compared With Other Studies

The recent literature regarding agricultural processing plants in rural areas is dominated by accounts of the shift in meatpacking plants from urban to rural areas in the Great Plains. These studies have emphasized a variety of social problems, including housing shortages, increases in crime, and increased demands for social assistance and special services. It is clear that the North Dakota communities studied here did not experience either the levels of inmigration or the social problems reported in the other studies. Although the job openings of the North Dakota plants sometimes dwarfed the local labor pool (e.g., Dakota Growers' workforce of 275 represents 15 percent of Foster County's pre-project employment), most of the jobs were filled by area workers. Those workers who did relocate to the host communities were reported to be easily assimilated. While a thorough analysis of the reasons behind the differences in community effects is beyond the scope of this study, these differences appear to be substantial.

Methods

The research plan first required selection of processing plants and communities to be studied. The authors identified agricultural processing plants that had been developed during the 1990s in nonmetro counties of North Dakota. Four projects met these criteria and employed at least 40 workers as of the third quarter of 1998 (when selection decisions were made). In each of the site communities, the authors conducted indepth interviews with a cross-section of community leaders, with the aim of gaining an understanding of the community (i.e., its population, economic base, etc.), the effects of project development, other socioeconomic changes that might have either exacerbated or offset the project's effects, and the community's response to the situation. Representatives of each of the processing plants were also interviewed.

Subsequently, a short survey was completed by a random sample of residents in each community. The survey was administered using a dropoff and pickup procedure and focused on the residents' satisfaction with their community and the effects of processing plant construction and operation on the community. The survey resulted in 469 usable responses, for a response rate of 85 percent. In addition, the questionnaire was completed by 36 of the leaders who were interviewed (9 in each community), for a response rate of 75 percent.

Lessons Learned

The community leaders interviewed over the course of this study were asked about their advice for other communities facing the prospect of a similar project. Their advice fell into four major categories.

Appropriateness of Project and Compatibility with Community. Leaders felt that the first consideration must be determining whether the project is economically feasible. In that regard, all four of the projects examined in this study had feasibility studies professionally prepared. Even so, the ProGold project faced serious problems stemming from unanticipated overcapacity in the HFCS market. The leaders also emphasized the importance of determining if the project is a "good fit" for the community in terms of infrastructure and labor force. This means that the leaders must have a thorough understanding of local capabilities (e.g., a local labor survey may be helpful to determine if the labor force will be sufficient to meet the firm's needs). In general, the community should ask how the company fits into the community's long-term plan.

Infrastructure Planning and Financing. Community leaders emphasized the importance of evaluating the costs of infrastructure improvements that might be required and, more generally, the short-term and long-term implications of the project and the incentive package that might be proposed. These issues need to be considered on a case-by-case basis. Also, in planning for infrastructure needs, the community should keep in mind that the effect of a project may be to offset a decline in other sectors, thus stabilizing the community rather than resulting in substantial growth.

Anticipating Issues and Needs. Examining experiences of other communities that had been sites of similar projects might help in identifying issues or needs that are likely to arise. Based on the experiences of the communities in this study, three issues are likely to arise with many agricultural processing projects: affordable housing, day care (especially for shift workers), and environmental (air and water) quality.

Development Approach and Attitude. Especially in the smaller towns, the leaders emphasized that attracting or developing a viable industry is a major challenge, and that the alternative is to watch the community decline. Their advice was for rural communities to continue their development efforts and to recognize that the number of failures in these endeavors will always exceed the number of successes. They also suggested that communities should take a more regional approach to development, as the benefits of projects like those studied are regional in nature. Specifically, they felt that neighboring communities might consider pooling their resources to develop or attract a new plant. RA

For Further Reading . . .

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