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Economic Impact of the North Dakota Ethanol Industry

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Expanded processing of agricultural commodities within North Dakota has frequently been identified as an important strategy for economic development. When agricultural commodities are processed at facilities located in the state, additional jobs and income and an expanded tax base result. The North Dakota ethanol industry is an example of value-added agricultural processing that is currently operational in the state. Consisting of two plants located near Grafton and Walhalla, the ethanol industry in North Dakota currently uses about 10 million bushels of corn to produce about 28 million gallons of ethanol annually. The two plants together employ about 100 workers. The **purpose** of this report is to estimate the economic impact of the ethanol industry in North Dakota.

The procedure used in this analysis is similar to that used in estimating the economic impact of other types of agricultural processing facilities (for example, see Leistritz et al. 1994 and Bangsund and Leistritz 1993). Expenditures by the companies involved in ethanol production in North Dakota constitute the basic data for the study. The North Dakota Input-Output Model was used to analyze these data.

The North Dakota Input-Output Model consists of interdependence coefficients or multipliers that measure the level of business activity generated in each economic sector from an additional dollar of expenditures in a given sector. (A sector is a group of similar economic units, e.g., the firms engaged in retail trade make up the retail trade sector.) For a complete description of the input-output model, see Coon et al. (1985 and 1989). This model estimates the changes in gross business volume (gross receipts) for all sectors of the state economy that arise from the direct expenditures associated with operation of the state's ethanol plants. The increased gross business volumes are used to estimate secondary employment and tax revenues based on historic relationships.

During 1993, the North Dakota ethanol industry made direct expenditures to in-state entities totaling about $32.5 million (Table 1). Sectors receiving substantial expenditures include *agriculture-crops; construction; communications and public utilities; finance, insurance, and real estate;* and *households*. Expenditures to the *agriculture-crops* sector were for corn and other raw materials. The values here reflect the fact that, if the ethanol industry were not present in the state, corn growers could sell their grain to other markets (probably out of state). On the other hand, the ethanol industry's corn purchases (about 10 million bushels annually) have a positive effect on regional corn prices (Johnson 1994); this price enhancement effect is reflected in the estimates reported here.

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The direct expenditures of the ethanol firms are estimated to generate total annual economic impacts of about $102 million (Table 1). Sectors receiving substantial increases in gross receipts include *households* and *retail trade*. The receipts of the *households* sector are essentially personal income and include wages and salaries, as well as payments for interest, rents, and profits received by state residents.

In addition to the 100 persons directly employed by the ethanol plants, the industry is estimated to create about 1200 secondary jobs through the multiplier effects of industry expenditures (Table 2). Sectors that have substantial secondary employment effects include *retail trade, transportation, professional and social services,* and *government*.

Additional business activity from the ethanol industry generates more state tax revenues. Additional sales and use tax, personal income tax, and corporate income tax receipts resulting from the ethanol plants and their multiplier effects total about $1.5 million annually (Table 2).

In summary, the North Dakota ethanol industry provides an additional market and higher corn prices for the region's farmers and also additional jobs, gross business volume, and tax revenues for the state economy. Instead of exporting raw feed grains, processing plants represent an opportunity to increase the value of North Dakota's agricultural products before they leave the state.

References

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TABLE 1. DIRECT AND TOTAL IMPACTS OF THE NORTH DAKOTA ETHANOL INDUSTRY, BY SECTOR, 1993

Economic Sector	Direct Impacts	Total Impacts
	-------- *$000* --------	
Agriculture, livestock	0	1,897
Agriculture, crops	12,452	14,008
Construction	2,682	4,994
Transportation	1,458	1,833
Communications and public utilities	3,681	6,421
Agricultural processing and misc. manufacturing	0	2,687
Retail trade	1,958	21,223
Finance, insurance, and real estate	3,767	7,891
Business and personal services	140	1,795
Professional and social services	392	2,267
Households	2,340	28,062
Government	666	3,606
Other[a]	3,010	5,747
Total	32,546	102,429

[a]Includes nonmetal mining, coal mining, electric generation, petroleum exploration/extraction, and petroleum refining.

TABLE 2. ESTIMATED SECONDARY EMPLOYMENT AND REVENUE FROM SELECTED STATE TAXES RESULTING FROM NORTH DAKOTA ETHANOL INDUSTRY, 1993

Secondary Employment:	Number of Jobs
Construction	78
Transportation	119
Communication and public utilities	72
Retail trade	184
Finance, insurance, and real estate	67
Business and personal services	105
Professional and social services	144
Government	250
Other[a]	181
Total	1,200

State Tax Revenues:	- $000 -
Sales and use	983
Personal income	365
Corporate Income	170
Total	1,518

[a]Includes agriculture, nonmetal mining, agricultural processing and miscellaneous manufacturing, coal mining, electric generation, petroleum exploration/extraction, and petroleum refining.

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