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The Economic Impact of the NDSU Research Center at Hettinger, North Dakota on the Local and Regional Economy

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Scattered throughout North Dakota are nine agricultural experiment stations whose mission is providing localized and regional applied agricultural research. Together with the main experiment station on the campus of North Dakota State University, they provide the residents of North Dakota with the new technology in agricultural science needed to maintain the state's major industry¹ (Coon and Leistritz 1995). The payrolls of these out-state facilities are often major contributors to the local economies, and their employees are a visible presence in the local community. While a study of the total state impact of North Dakota State University has been completed (Coon et al. 1986), no measure has ever been done on the local impact of a branch agricultural experiment station on the local economy.

This paper will estimate the local and regional impact of the NDSU Research Center at Hettinger on the economy of Adams County and the surrounding region. An impact is the result of new money coming into the local economy from sources outside the area (Coon et al. 1986). For this study all dollars spent at Hettinger were assumed to be outside funds. The logic for this is that the state-appropriated dollars for the Hettinger Research Center are generated from tax revenues. The population of Adams County is approximately 4.9 percent² of the state's total population (Coon et al. 1995). Assuming that tax revenues collected are uniform on a per capita basis across the state, Adams County's contribution to the state appropriated dollars in the Hettinger Research Center's budget will be negligible. Crop and livestock income is also assumed to come from outside the study area, as are federal funds and grant dollars spent at the research center. All expenditures are, therefore, assumed to be economic impacts to the local economy.

PROCEDURE

Expenditures for the Hettinger Research Center were compiled for the 1993 to 1995 biennium and were allocated to the 17 sectors of the economy used by the North Dakota input-output model. Biennial data were used to ensure that expenditures were not biased by purchases

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¹In 1993 sales for final demand in North Dakota for agricultural products was \$3,599.4 million from a total final demand sales of \$9,546.0 million. Agricultural sales totaled 37.7 percent of final demand sales (Coon and Leistritz 1995).

²In 1990 the total state population was 638,800 and Adams County's population was 3,174 (Coon et al. 1995).

made in one year of the budget that reflect a total sum available for two years. Total expenditures were recorded from all sources including state-appropriated dollars, grants and contracts, federal sources, and income monies. All incomes were assumed to be from sources from outside the area. This expenditure data was then processed with the North Dakota input-output model to estimate economic impacts on the local county and on a business region defined as covering an area within 65 miles of the town of Hettinger. The 65-mile radius was chosen to include Dickinson, the nearest city classified as a complete shopping city (Coon et al. 1995). Expenditures in the balance of the state and out-of-state spending were also measured.

ALLOCATION

Expenditures were allocated to the 17 sectors by assessing the type of purchase, or spending, from the invoice. Travel expenditures are allocated as 75 percent retail and 25 percent business and personal service. All travel was allocated either to in-state or out-of-state. No travel dollars were assumed used in Adams County or the local region.

MODEL, COEFFICIENTS, RATIOS, AND VALIDATION

Input-output analysis was chosen for this study because of its ability to provide estimates of business volumes and employment effects relative to an infusion of activity from an outside source. North Dakota's model divides economic activity into seventeen sectors for analysis. Interdependence coefficients for the relationship between sectors allow for estimation of effects in a sector relative to changes in other sectors (Leistritz 1994). Productivity ratios allow for estimation of employment relative to business activity in each sector (Coon et al. 1986). North Dakota's input-output model is considered quite accurate in its estimations with a Thiel coefficient³ of near 0.0 (Coon et al. 1986).

EXPENDITURES AND TOTAL BUSINESS ACTIVITY

Total expenditures for the Hettinger Research Center during the 1993-95 biennium were \$809,000. Of this total, \$578,000 or 71 percent was spent in Adams County. Drawing a circle around the city of Hettinger with a 65-mile radius encloses a business trade area that includes all or parts of nine counties. In this area the Research Center did business with firms in four of the nine counties (Adams, Bowman, Hettinger, and Stark); the regional impact will be reported as the effect on those four counties. The expenditures in the four-county area were \$617,000 or 76 percent of the total.

An additional \$106,000 was spent in the state outside the four county area, with total in-state expenditures being 89 percent of the total. The balance was spent out of state (Tables 1 and 2).

³For a discussion of the Thiel coefficient and the formula used to calculate it, see Coon et al. (1985) and Pindyck and Rubinfeld (1991).

TABLE 1. DIRECT EXPENDITURES OF HETTINGER RESEARCH CENTER, ANNUAL AVERAGE FOR THE 1993-95 BIENNIUM

Annual Average Spent, 1993 to 1995 Biennium		Adams County		Four-County Aea	
Sector	Total \$ Spent	\$	%	\$	%
Livestock	15,309	12,313	80	12,313	80
Crops	176	146	83	176	100
Sand/gravel	417	417	100	417	100
Construction	9,734	9,734	100	9,734	100
Transportation	1,312	1,099	84	1,099	84
Communication	11,810	4,466	38	7,779	66
Manufacturing	10,580	7,754	73	9,423	89
Retail	75,374	47,680	63	61,690	82
Fire	34,852	0	0	0	0
Business services	5,899	2,939	50	3,363	57
Professional services	2,935	1,476	50	1,485	51
Household	200,067	198,254	99	198,556	99
Government	36,275	2,583	7	2,583	7
Coal mine	0	0	0	0	0
Elec generate	0	0	0	0	0
Petr explore	0	0	0	0	0
Petr refine	0	0	0	0	0
Total spent	404,737	288,858		308,616	
Percent of total	100%	71%		76%	

On an annual basis, the Hettinger Research Center spends just under \$300,000 in Adams County with an annual business activity impact of \$858,000. This translates to \$570,000 of additional economic activity in the community due to the presence of the research center. Each dollar of new money brought to the research center results in about two dollars of gross business volume in other sectors of the local economy. Put another way, a reduction in expenditures at the Research Center of \$10,000 results in a loss of \$7,100 of direct activity and an additional indirect loss of \$13,987 of business activity in Adams County.

The indirect employment in Adams County attributable to the increase in business volume created by the direct expenditures of the research center is about six jobs.

In the four-county regional economy, an additional \$47,000 of secondary business activity is generated. Together with the \$20,000 of direct expenditures, an additional one-half job is created in the region.

**TABLE 2. INDIRECT GROSS BUSINESS VOLUME OF HETTINGER RESEARCH CENTER,
ANNUAL AVERAGE 1993-95 BIENNIUM**

1993-1995 Biennial Business Activity, Average Annual Impact			
Sector	Adams County	Local Region	State
Livestock	35,000	36,500	39,000
Crops	17,000	18,500	20,500
Sand/gravel	2,500	2,500	2,500
Construction	31,500	32,500	34,500
Transportation	4,000	4,000	4,500
Communication	31,500	36,000	40,000
Manufacturing	32,000	35,500	39,000
Retail	231,000	251,500	277,000
Fire	41,000	42,500	72,500
Business services	18,000	19,000	22,500
Professional services	24,500	25,500	28,000
Household	361,000	371,000	406,000
Government	29,500	30,500	52,500
Coal mine	0	0	0
Elec Generate	0	0	0
Petr explore	0	0	0
Petr refine	0	0	0
Total	858,000	905,000	1,039,000
Secondary employment	6	6.5	9

The research center's annual contribution to the economy of the state is \$361,739 in direct expenditures and an additional \$676,761 in indirect activity. Total state indirect job benefit is nine jobs on an annual basis.

Tables 2 and 3 show the results by sector for each region in the study.

TABLE 3. DIRECT EXPENDITURES OF HETTINGER RESEARCH CENTER, ANNUAL AVERAGE FOR 1993-95 BIENNIUM

1993 to 1995 Biennium		In-state		Out-state		
Sector	Total \$ Spent	\$	%	\$	%	
Livestock	15,309	12,313	80	2,996	20	
Crops	176	176	100	0	0	
Sand/gravel	417	417	100	0	0	
Construction	9,734	9,734	100	0	0	
Transportation	1,312	1,249	95	63	5	
Communication	11,810	7,779	66	4,032	34	
Manufacturing	10,580	10,552	100	28	0	
Retail	75,374	66,498	88	8,877	12	
Fire	34,852	25,736	74	9,116	26	
Business	5,899	4,935	84	965	16	
Professional	2,935	2,025	69	910	31	
Household	200,067	198,695	99	1,373	1	
Government	36,275	21,633	60	14,642	40	
Coal mine	0	0	0	0	0	
Elec generate	0	0	0	0	0	
Petr explore	0	0	0	0	0	
Petr refine	0	0	0	0	0	
Total \$ and %	404,737	100	361,739	89	42,998	11

EMPLOYMENT

Employment at the Hettinger Research Center is eight full time employees, three scientists, and five technical support positions. There is also some timeslip spending for seasonal farm work and data entry. Secondary employment resulting from generated business activity is six full-time jobs in Adams County and an additional one-half of a job in the region. Total state secondary job creation is nine jobs as a result of the research center's business activity.

SUMMARY

In summary, NDSU's Research Center at Hettinger has a notable effect on the economy of the region and Adams County. Total gross business volume generated by the research center amounts to one half of one percent of the county's gross business volume. Direct and secondary employment is 0.8 percent of the county's estimated employment base. The 14 direct and secondary jobs resulting from the research center's activities are equivalent to an impact in Cass

County of 550 jobs. Secondary impacts are strongest in nonmetal mining, construction, transportation, communications and public utilities, retail, professional services, households, and government, with business activity levels at 0.6 percent or more of county total in each of the categories (Table 4).

TABLE 4. ESTIMATED GROSS BUSINESS ACTIVITY, ADAMS COUNTY TOTAL AND PORTION GENERATED BY THE RESEARCH CENTER

Sector	Adams County	Research Center	Percent
Ag livestock	17,204	35.0	0.20
Crops	29,117	17.0	0.06
Nonmetal mine	336	2.5	0.74
Construction	4,192	31.5	0.75
Transportation	566	4.0	0.71
Comm & utility	4,361	31.5	0.72
Manufacturing	11,816	32.0	0.27
Retail	37,190	231.0	0.62
Fire	7,711	41.0	0.53
Business	3,370	18.0	0.53
Professional	3,528	24.5	0.69
Household	53,623	361.0	0.67
Government	4,703	29.5	0.63
Coal mine	0	0	
Elec gen	0	0	
Petr expl	0	0	
Petr refine	0	0	
Total	177,715	858.0	0.48

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