

Estimated Economic Effects for a Model Dairy Operating in Non-Metropolitan Nebraska

August 2006

Dairy Production Information for this
report supplied by:

Jeffrey F. Keown, Professor
Extension Specialist, Animal Sciences
University of Nebraska-Lincoln
Lincoln, NE 68583-0908
Telephone: (402) 472-6453
Email: jkeown1@unl.edu

For additional information on dairy-related
inputs, please contact Dr. Jeff Keown

Report prepared by:

Donis N. Petersan, Ph.D., CEcD
Economist
Economic Development Department
Nebraska Public Power District
1414 15th Street - Box 499
Columbus, Nebraska 68602-0499

Telephone: (402) 563-5304 or (800) 282-6773
Email: dnpeter@nppd.com

For information on the report analysis, please contact
Dr. Donis Petersan

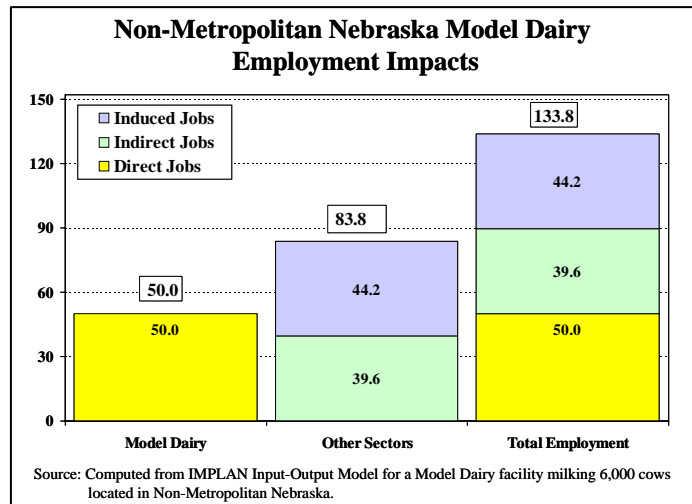
Executive Summary

This report presents an analysis of the positive employment, income, and other economic effects associated with the operation of a model 6,000 cow dairy facility located in Non-Metropolitan Nebraska. The methodology used to estimate the economic impacts associated with this facility utilize a Micro IMPLAN input-output model constructed for the Non-Metropolitan area of Nebraska which, for the purposes of this analysis, is assumed to include Nebraska except Cass, Douglas, Sarpy, and Washington counties from the Omaha Metropolitan Area and Lancaster County from the Lincoln Metropolitan Area.

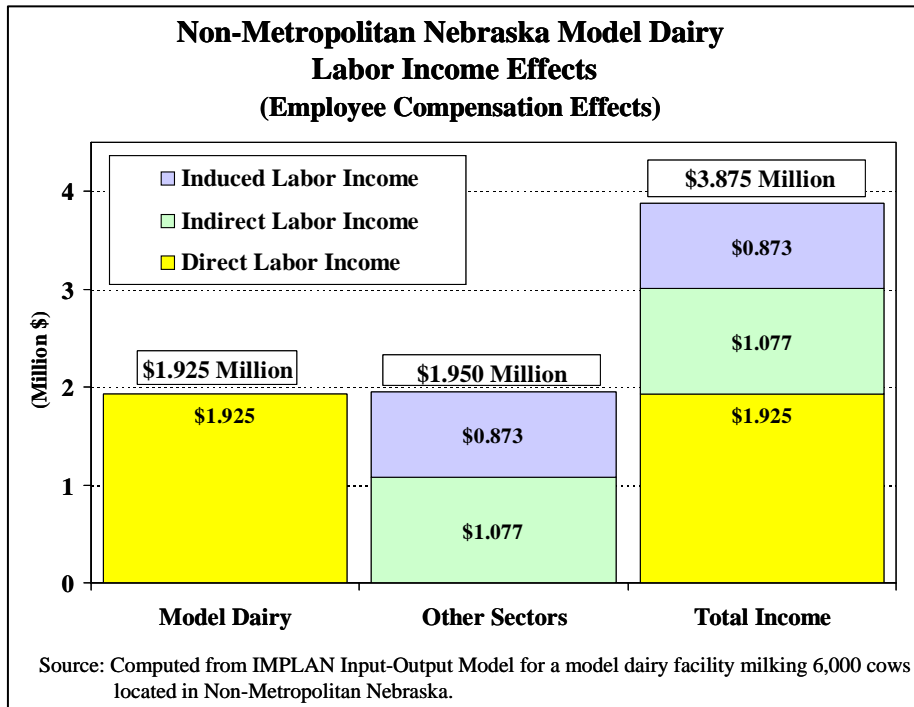
A summary of the major positive employment and other economic effects associated with the model dairy facility are presented in this Executive Summary.

Employment Effects:

The annual employment directly related to the operation of the model dairy facility is estimated to be 50 employees (FTEs). When the secondary employment effects in other economic sectors are added, the total employment effects for the Non-Metropolitan Nebraska area are estimated to be 133.8 jobs, including the 50 direct jobs in the model dairy and 83.8 secondary (39.6 indirect and 44.2 induced) jobs in other economic sectors.

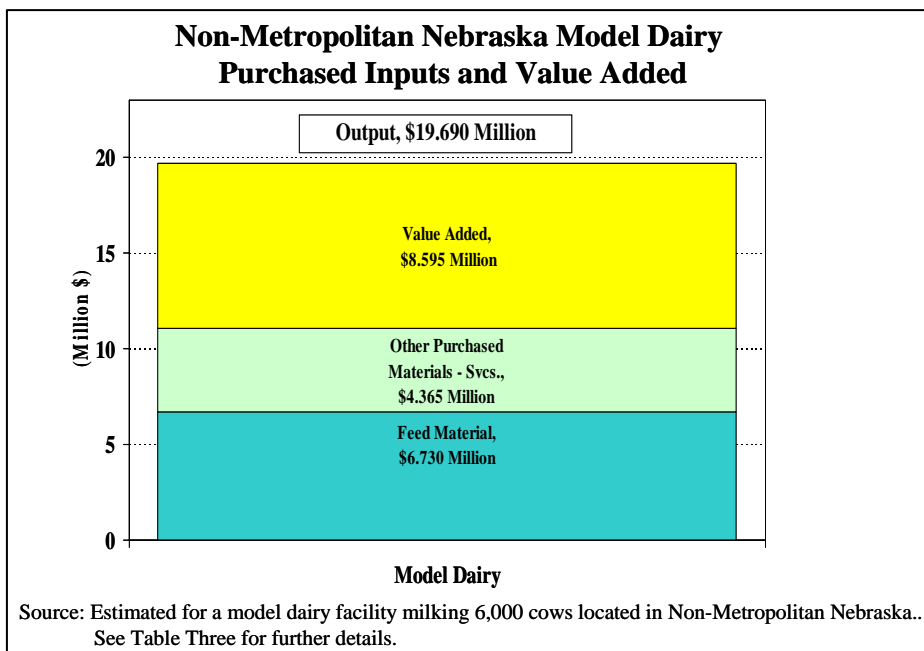


Labor Income and Other Income Effects: The direct employment in the model dairy will result in the direct addition of an estimated \$1,925,000 in employee compensation (including benefits and other adders) for the dairy workers and to the economy of Non-Metropolitan Nebraska. When the labor income effects associated with the secondary (indirect and induced) employment and economic activity are considered, the total labor income effects related to the model dairy total \$3,874,600, including the \$1,925,000 of compensation for the dairy workers, \$1,076,800 of labor compensation for employees employed in sectors supplying inputs to the dairy (indirect workers) and \$872,800 of compensation for workers in jobs related to the induced effects (jobs supported by the additional household income, including direct and indirect, resulting from the model dairy).



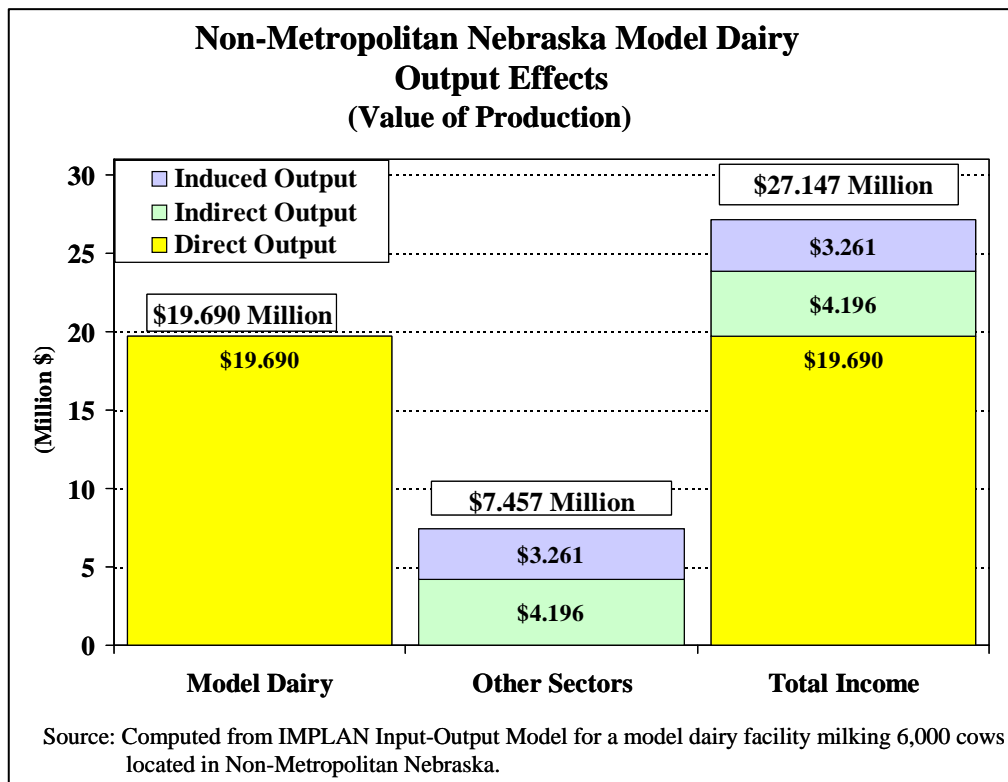
Value Added by the Model Dairy

A model dairy would add significant value to the feed material and other purchased inputs that it would obtain from the local economy. As the below chart indicates, it is estimated that the model dairy would utilize \$6.73 million dollars of feed materials, would purchase \$4.365 million of additional material inputs and services, and would add \$8.595 million of additional value to these inputs. The estimated value added by the model dairy includes the returns to the factors of production (labor, land, capital) in the form of wages, net income, depreciation, and taxes and other payments.



Indirect Business Taxes: The model dairy would be expected to pay an estimated \$180,000 in direct property taxes on the real and personal property. There is an additional \$84,000 of additional indirect business taxes estimated for this facility. The indirect business taxes, in addition to the property taxes on the facility, include taxes on other property, excise taxes, fees, licenses, sales tax, and other taxes that occur during the normal operation of the business, but do not include taxes on profits or income. When the secondary (indirect and induced) effects are considered, the total indirect business taxes related to the operation of the model dairy facility are estimated to be \$433,300 (\$264,000 direct and \$169,300 secondary [indirect] business taxes).

Total Output Effects: The total value of output directly associated with the model dairy facility is estimated at \$19,690,000 annually. When the secondary output effects are added to the direct output component, the total output effects associated with the facility are estimated to be \$27,146,600.



Estimated Economic Effects for a Model Dairy Operating in Non-Metropolitan Nebraska

Introduction

This report presents an analysis of the estimated employment and other economic effects expected to be associated with the operation of model dairy facility with 6,000 cows located in Non-Metropolitan Nebraska. The methodology employed to estimate the economic effects of the project utilizes a computerized input-output (I-O) model constructed for the Non-Metropolitan area of Nebraska which, for the purposes of this analysis, is assumed to include all of Nebraska except Cass, Douglas, Sarpy, and Washington counties from the Omaha Metropolitan Area and Lancaster County from the Lincoln Metropolitan Area.

The I-O model was developed with the 2003 Micro IMPLAN database and input-output modeling software. The IMPLAN database consists of 21 economic and demographic variables for 509 industrial sectors for each of the 3,000 counties in the United States. Some of these variables include employment, payments to labor, payments to other factors of production, and output by industry sector, as well as household and government purchases.

The IMPLAN model and database system is used to build an I-O model for the Non-Metropolitan area that identifies inter-industry linkages within the economy. From this model, multipliers are developed (employment, employee compensation, indirect business taxes, and output) which can be applied to assess the anticipated economic and employment effects associated with the operation of the model dairy facility.

Although the current version of the IMPLAN I-O modeling software and database does not explicitly contain a dairy sector, this limitation has been overcome by creating such a sector within the model and specifying a production function and other operating parameters for the dairy sector, utilizing data obtained from a sample of Midwest dairy operations.

Direct Economic Effects

The analysis provided in this report assumes the model dairy facility operating in Non-Metropolitan Nebraska would milk 6,000 cows and would employ 50 dairy workers. It is further assumed, for the purposes of this analysis, that the only output would be the milk produced by the dairy. The annual value of the dairy facility output is estimated to be \$19,690,000 (see Table One). The model dairy would have 50 employees and the annual employee compensation costs would be an estimated \$1,925,000 including benefits and other adders.

Estimates of the direct economic effects associated with the operation of the model dairy facility are presented in Table One. As the data in the table indicate, the total value of annual production is estimated at \$19,690,000, all of which would be the value of the milk produced and sold by the dairy.

Annual property taxes for the model dairy facility are estimated to be \$180,000, based on an assumed assessed valuation of \$12,000,000 and a tax rate of \$1.50 per \$100 of valuation. The estimated indirect business taxes (\$264,000) shown in Table One includes the estimated \$180,000 in local property taxes, in addition to \$84,000 for other indirect business taxes, including excise, other property taxes, fees, licenses, and sales and other taxes paid during the course of the normal operation of a business. These indirect business taxes do not include taxes on profits or income.

Employment	50
Total Employee Compensation	\$1,925,000
Indirect Business Taxes	\$264,000
Property Taxes	180,000
Other Indirect Business Taxes	84,000
Output (Value)	\$19,690,000

^(a) Operating data, including the number of employees, employee compensation, indirect business taxes, and output, estimated for a 6,000 cow model dairy from data obtained for dairies operating in the Midwest. See text for further discussion.

As noted, in order to evaluate the economic effects associated with the model dairy facility, data was obtained for a sample of dairies operating in the Midwest. These data have been used to identify the important operating parameters for the model dairy which is assumed to be located in Non-Metropolitan Nebraska. Table Two provides data used to specify the major inputs and the basic operating parameters for the dairy. As this table shows, one of the major inputs for the model dairy includes the feed materials, which includes grain, hay, soybean products, silage, distillers grains and gluten materials, as well as other feed materials and supplements. Other major cost items include the labor inputs, herd replacements costs, which for the purposes of this analysis are assumed to consist primarily of depreciation of dairy cows.

Table Two
Estimated Feed and Other Inputs (Expenses) Associated with
the Operation of a Model Dairy in Non-Metropolitan Nebraska^(a)

INCOME:	AMOUNT	PER COW	PERCENT
Gross income (Milk)	\$19,690,000	\$3,282	100.00
EXPENSES:			
Feed Costs	\$6,730,000	\$1,147	34.18
Herd replacement cost	2,050,000	341	10.41
Employee compensation (including benefits and adders)	1,925,000	321	9.78
Other operating expenses:			
Interest and rent	1,248,000	\$208	6.34
Supplies	1,002,000	167	5.09
Depreciation (other than livestock)	918,000	153	4.66
Repair and maintenance	870,000	145	4.42
Veterinary and breeding	516,000	86	2.62
Milk hauling	402,000	67	2.04
Utilities	348,000	58	1.77
Fuel and oil	303,500	51	1.54
Taxes and licences	264,000	44	1.34
BST	258,000	43	1.31
Insurance	258,000	43	1.31
Industry assessments	252,000	42	1.28
Testing and trimming	156,000	26	0.79
Legal and accounting	144,000	24	0.73
Miscellaneous	72,000	12	0.37
Hauling livestock	36,000	6	0.18
Total other expenses	\$7,047,500	\$1,175	35.79
Total expenses	\$17,752,500	\$2,983	90.16
NET INCOME	\$1,937,500	\$299	9.84

^(a) Operating parameters estimated for a 6,000 cow model dairy in Non-Metropolitan Nebraska using data obtained for dairies operating in the Midwest.

The model dairy would add significant value to the feed material and other purchased inputs that are purchased from the local economy. As the data presented in Table Three indicate, it is estimated that the model dairy would utilize \$6.73 million dollars of feed materials, the greatest share of which would be purchased locally, would purchase \$4.365 million of additional material inputs and services, and would add \$8.595 million of additional value to these inputs. The estimated value added by the model dairy include returns to the factors of production in the form of wages, net income, depreciation, and taxes and other payments.

Table Three
Estimated Value Added for a Model Dairy
Operating in Non-Metropolitan Nebraska^(a)

	AMOUNT	PER COW	PERCENT
Value of Output	\$19,690,000	\$3,282	100.00
Purchased Inputs:			
Feed Costs	\$6,730,000	\$1,147	34.18
Other Purchased Inputs*	4,365,500	728	22.17
(*Includes, supplies, repair and maintenance, veterinary and breeding, milk hauling, utilities, fuel and oil, BST, insurance, testing and trimming, legal and accounting, hauling livestock and other miscellaneous purchases.)			
Total Purchased Inputs	\$11,095,500	\$1,875	56.35
Value Added:			
Employee compensation	\$1,925,000	\$321	9.78
Other Value Added**	6,669,500	1,087	33.87
(**Includes, herd replacement costs, interest and rent, other depreciation, taxes and licences, industry assessments and net income.)			
Total Value Added	\$8,594,500	\$1,407	43.65

^(a) Operating parameters estimated for a 6,000 cow model dairy in Non-Metropolitan Nebraska. Purchased inputs (materials and services) and value added calculated using data from Table Two.

Economic Impact Analysis

As previously noted, in order to analyze the potential economic effects associated with the operation of the model dairy located in Non-Metropolitan Nebraska, an I-O model was developed using the IMPLAN database and I-O modeling software.

An estimate of the secondary (indirect and induced) economic effects results from an evaluation of the capacity of the study area economy to supply the increased demand for goods and services created by the operation model dairy facility. In the case of the Non-Metropolitan Nebraska area economy much of the increased demand for feed materials and other purchased inputs of materials and services would be obtained locally. In the case of the increased demand for consumer goods and services created by the model dairy, a portion would be provided from the local area and a portion would be obtained from outside the local economy.

Table Four presents multipliers estimated from the IMPLAN I-O model for the dairy sector of the Non-Metropolitan area economy. These multipliers include the employment, labor (employee compensation) income, indirect business taxes, and output multipliers developed for the model dairy sector. The multipliers are applied to the direct economic effects estimated for the model dairy facility (shown in Table One) to obtain an estimate of the total expected employment and other economic impacts associated with the operation of a model dairy milking 6,000 cows located in Non-Metropolitan Nebraska.

Table Four
Input-Output Multipliers for the Non-Metropolitan Nebraska Economy
Derived for the Dairy Production Sector

Multipliers*	Direct	Indirect	Induced	Total	Multipliers ^(a)	
					Type I ^(b)	Type SAM ^(c)
Employment	2.5394	2.0097	2.2429	6.7919	1.7914	2.6747
Employee Compensation	0.0978	0.0547	0.0443	0.1968	1.5594	2.0129
Indirect Business Taxes	0.0134	0.0014	0.0072	0.0220	1.1077	1.6413
Output	1.0000	0.2131	0.1656	1.3787	1.2131	1.3787

^(a)The multipliers for an IMPLAN Sector created and specified for dairy production activities.

*Direct, Indirect, Induced and Total effects are per million dollars of output

^(b) Type I = (Direct + Indirect) / Direct

^(c) Type SAM = (Direct + Indirect + Induced) / Direct

Source: Calculated for the Non-Metropolitan Nebraska economy using the Mico IMPLAN database computer I-O modeling software. See text for further discussion.

Estimated Economic Effects Associated with the Model Dairy Facility

As the data provided in Table One indicate, the analysis of the economic effects associated with the operation of the model dairy facility begins with the direct employment, output, labor income, and other payments to the factors of production associated with this facility. The data presented in Table One provided basic data on the direct employment, labor (employee compensation) income, the value of output, and indirect business taxes associated with the operation of the model dairy facility. Using these estimates, in conjunction with the multiplier values derived from the IMPLAN I-O model for the study area economy, estimates of the indirect and total employment and other economic effects associated with the operation of the model dairy facility have been derived. The estimates of the secondary (indirect and induced) and total economic and employment effects associated with the model dairy facility are presented in Table Five.

- Employment Effects

As previously stated, the direct employment required to operate the model dairy facility is estimated to be 50 employees (FTEs). The direct, secondary (indirect and induced), and total employment effects resulting from the increase in economic activity associated with the operation of the dairy facility are presented in Table Five. As these data indicate, the total employment effects associated with the model dairy facility are estimated to be 133.8 jobs (50 direct jobs in the model dairy and 83.8 secondary, or 39.6 indirect and 44.2 induced jobs, in other economic sectors).

Table Five
Summary of Output, Employment and Labor Income Impacts Associated with
the Operation of a Model Dairy in Non-Metropolitan Nebraska
(Annual Estimates)

	Dairy Sector	Other Economic Sectors	Total Economic Impacts
Employment Effects			
Direct Employment (FTE)	50.0	0.0	50.0
Indirect Effects [0.7920 of Direct]	0.0	39.6	39.6
Induced Effects [0.8840 of Direct]	0.0	44.2	44.2
Total Employment (FTE)	50.0	83.8	133.8
Labor Income Effects			
Direct Employee Compensation	\$1,925,000	\$0	\$1,925,000
Indirect Effects [0.5594 of Direct]	0	1,076,800	1,076,800
Induced Effects [0.4534 of Direct]	0	872,800	872,800
Total Labor Income Effects	\$1,925,000	\$1,949,600	\$3,874,600
Indirect Business Tax Effects			
Direct Employee Compensation	\$264,000	\$0	\$264,000
Indirect Effects [0.0148 of Direct]	0	28,400	28,400
Induced Effects [0.0732 of Direct]	0	140,900	140,900
Total Labor Income Effects	\$264,000	\$169,300	\$433,300
Output Effects			
Direct Output (Value of Production)	\$19,690,000	\$0	\$19,690,000
Indirect Effects [0.2131 of Direct]	0	4,195,900	4,195,900
Induced Effects [0.1656 of Direct]	0	3,260,700	3,260,700
Total Output Effects	\$19,690,000	\$7,456,600	\$27,146,600

Note: Estimated economic (employment, labor income and output) effects associated with the model dairy operation in Non-Metropolitan, Nebraska.

Source: Computed from IMPLAN Input-Output Model for the Non-Metropolitan Nebraska economy.

- Labor Income Effects

The direct employment in the model dairy will result in the direct addition of an estimated \$1,925,000 in employee compensation (including benefits and other adders) for the dairy workers and to the economy of Non-Metropolitan Nebraska. When the labor income effects associated with the secondary (indirect and induced) employment and economic activity are considered, the total labor income effects associated with the model dairy total \$3,874,600, including the \$1,925,000 of compensation for the dairy workers, \$1,076,800 of labor compensation for employees employed in sectors supplying inputs to the dairy (indirect workers) and \$872,800 of compensation for workers filling jobs created because of the induced effects (jobs supported by the additional household incomes, including direct and indirect, created because of the model dairy).

- Total Output Effects

The total value of output directly associated with the model dairy facility is estimated at \$19,690,000 annually. When the secondary output effects (\$4,195,900 indirect output and \$3,260,700 induced output) are added to the direct output component, the total output effects associated with the facility are estimated to be \$27,146,600.

- Indirect Business Taxes Effect

Indirect Business Taxes (IBT) for the model dairy facility are estimated to be \$264,000 (see Table One), and include an estimated \$180,000 in local property taxes on the real and personal property. There is an additional \$84,000 of additional indirect business taxes estimated for the model dairy facility. The indirect business taxes, in addition to the property taxes on the facility, include taxes on other property, excise taxes, fees, licenses, sales tax, and other taxes that occur during the normal operation of the business, but do not include taxes on profits or income. When the secondary (indirect and induced) effects are considered, the total indirect business taxes related to the operation of the model dairy facility are estimated to be \$433,300 (\$264,000 direct and \$169,300 secondary [indirect] business taxes).

If further information about this analysis is desired or if the reader has questions about any aspect of this report, please contact:

**Donis N. Petersan, CEcD, Ph.D
Economist
Nebraska Public Power District
1414 15th Street - Box 499
Columbus, NE 68602-0499**

**Telephone: (402) 563-5304 or (800) 282-6773
E-mail: dnpeter@nppd.com**