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# The Economic and Fiscal Impacts of a Cheese Plant and Dairies in the Panhandle of Texas

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## Executive Summary

The following are findings of study, contracted by Elite Milk Producers, Inc., to determine the economic and fiscal impacts of a cheese plant and dairies to be constructed in the Lubbock region.

## Basis for analysis

- The region of analysis includes the counties of Cochran, Hockley, Lubbock, Hale, Lamb, Bailey, Parmer, Castro, Swisher, Hartley, Moore, and Dallam.
- We estimated the following economic impacts:
  - of the cheese plant construction on the region
  - of the dairies construction on the region,
  - of the cheese plant and dairies operations on the region,
  - of the cheese plant operations on Lubbock county.
- We estimated the fiscal impacts only for the operation of the cheese plant in Lubbock County. Fiscal impacts were not estimated for the region because the exact county location of the dairies within the region cannot be predicted and fiscal impacts depend on local tax rates, revenues and expenditure patterns.

## Jobs

- Operation of the cheese plant and dairies will create 4,810 jobs for 20 years.
- Construction of the cheese plant will create 750 jobs for 2 years.
- Construction of the dairies will create 484 jobs for 5 years.

## Wages

- 125 jobs in the cheese plant will pay \$45,000 annually.
- Additional jobs in the region will pay between \$26,800 and \$19,700 annually.

## Fiscal Impacts of Cheese Plant on Lubbock County

- Operation of the cheese plant creates 857 jobs in Lubbock county, 125 directly in the plant.
- County population increases by 935.
- School children increase by 210.
- Labor force increases by 614, net in-commuting increases by 116, and 127 unemployed take jobs.
- The county property tax base increases by \$109.5 million.
- Tax revenues for all jurisdictions in the county increase by \$2.28 million annually (nominal dollars).
- Inter-governmental revenues increase by \$.45 million annually for all jurisdictions in the county (nominal dollars).
- Expenditures increase by \$1.46 million annually for all jurisdictions in the county (nominal dollars).
- The net fiscal impact for all jurisdictions in the county is \$1.275 million annually (nominal dollars).
- The net present value of the fiscal impact over 20 years for all jurisdictions is \$17.12 million (real dollars).

**Fiscal Impacts of Dairies**

- Each dairy will increase the property tax base of the taxing jurisdiction within which it locates by approximately \$3,776,900.
- The impact of each dairy on other tax revenues and on county, municipal, school district and special district expenditures cannot be predicted without knowing their location.

## 1.0 Impact Analysis

The Region: The region of analysis includes the counties of Cochran, Hooley, Lubbock, Hale, Lamb, Bailey, Parmer, Castro, Swisher, Hartley, Moore, and Dallam.

Data: The majority of the data are from official sources, such as the Census Bureau and the state Comptroller's Office. Some data are from dairy experts. Also data specific to the project were provided by Elite Milk Producers. Data from official sources generally are several years old. Because the analysis concerns changes in the community, rather than absolute levels, this is generally not a serious problem, unless there have been major changes in the community in the interim.

Because of the way employment data are collected, there is no distinction between full-time and part-time jobs. Both count as a job.

Project Phases: The analysis is divided into two phases: a construction phase and an operations phase. Phases were necessary because the employment and income generated in the construction phase are temporary while the employment and income generated in the operations phase are permanent. In addition, construction of the cheese plant and of the dairies were estimated separately because the cheese plant is constructed over two years while the dairies are constructed over 5 years (Figure 1).

**Figure 1: Impact Analysis**

	<b>Construction</b>	<b>Operations</b>	<b>Phase-In</b>
<b>Cheese Plant Regional</b>	Annual for 2 years	Annual for 20 years	5 years operations
<b>Dairies Regional</b>	Annual for 5 years		5 years construction
<b>Cheese Plant in Lubbock</b>		Annual for 20 years	5 years operations

## **2.0 Construction Phase**

### **2.1 Regional Impact of Cheese Plant Construction**

The scenario used to estimate the regional impacts of the construction of the cheese plant is that the plant will be constructed over 2 years with an annual investment (output) of \$47.5 million and a total investment of \$95,000,000.

Research shows that a temporary project, such as construction, will have a smaller effect on the local economy than the same-sized permanent project. In the particular case of construction, some workers, who do not live permanently in the county, will take the temporary jobs. These migrant or in-commuting temporary workers will not spend as much locally as residents. Therefore, we have not included the induced effects of the construction phase in our analysis of the cheese plant, because it would likely overestimate the impact of the construction phase of the cheese plant on the county economy.

Construction of the plant will create 445 jobs in the region for two years with an annual employee compensation of \$9,429,314, an average compensation of approximately \$21,200 (Table 1). The construction will create an additional 305 jobs in other regional businesses for two years with an annual employee compensation of \$7,213,168, an average compensation of approximately \$23,640. Overall, construction of the cheese plant increases regional employment by 750 jobs with employee compensation of \$16,642,483 annually for 2 years. At the end of two years these jobs will terminate.

Indirect output increases by \$25,980,197 so that total output increases by \$73,480,197. Thus, on average each \$98,000 in increased output creates one job.

Although the annual investment in the cheese plant is \$47,500,000, the value added from this investment is only \$14,546,731, because much of the investment is in equipment which is not produced locally. Total value added increases by \$27,500,084. Construction of the cheese plant increases direct, and indirect proprietors' income by \$5,561,956.

### **2.2 Regional Impact of Dairy Farm Construction**

The scenario for analysis is that 4.8 dairy farms will be constructed annually for 5 years, for a

total of 24 dairy farms. Annual investment is estimated at \$23,760,000 for farm structures and 1.104,000 for residential structures. We used \$20,500 as the wage in the sector for construction of farm structures.

Construction of the dairy farms will directly create 196 jobs for 5 years with an annual employee compensation of \$3,944,794 (Table 2). The construction will create 288 additional jobs, 151 indirect jobs and 137 induced jobs. Additional annual employee compensation is \$6,187,554 (\$3,457,737 indirect and \$2,729,816 induced), an average compensation of approximately \$21,500. At the end of the five years these jobs will terminate. Induced effects are included because construction takes place over a five year period—long enough for induced effects to take place.

The direct investment (output) in dairy farms increases total output by \$49,185,464. Thus, on average each \$101,600 in increased output creates one job.

Although the annual investment on the dairies is \$24,864,000, the value added from this investment is only \$6,289,568 because most of the investment is in materials and equipment that are not produced locally. Total value added increases by \$18,625,675. Construction of the dairies increases direct, indirect and induced proprietors' income by \$2,832,217.

### **3.0 Operations Phase**

#### **3.1 Regional Impacts of Cheese Plant and Dairies Operations**

We used the following information to construct the scenario for the operation of the cheese plant and dairies. The cheese plant has an annual output of \$273,750,016 and an employment of 125 with average compensation of \$45,000, for a total employee compensation of \$5,625,000. Thus, payroll is 2.05 percent of the value of output for the cheese plant.

To supply the cheese plant, the dairies will need to produce a milk output of \$206,839,360 (using a five year average price of \$13.34 cwt). Dairy output also includes culled cows, excess heifers, and bull calves. The total annual output of the dairy sector was set at \$224,699,536. The annual compensation for dairy workers was set at \$26,800.

The cheese plant and the dairy operations were estimated together because the dairies are a backward linkage for the cheese plant. If their operations were estimated separately, some of the dairies

might have been double-counted. The output, income and jobs created during the operations phase are permanent, as are the indirect and induced effects. The impacts reported below are annual, thus they can be expected annually for as long as the plant and dairies function at full operation.

The dairies directly create 606 jobs (Table 3). Combined with the 125 direct jobs in the cheese plant, there are 731 direct jobs during the operations phase and a total direct employee compensation of \$21,722,558 in the region.

The operation of the cheese plant and the dairies causes an additional 4,079 indirect and induced jobs with annual employee compensation of \$81,740,222. The average compensation of these additional jobs is approximately \$20,000. There are 4,809 jobs created with a total annual employee compensation of \$103,462,780.

Total output in the region increases by \$956,093,814. Thus, on average each \$199,000 in increased output creates one job. Value-added in the region increases \$218,530,039. Direct, indirect and induced proprietors' income increases \$37,104,574.

#### **4.0 Fiscal Impacts of Cheese Plant Operations on Lubbock County**

##### **4.1 Fiscal Impact Analysis**

The new employment is the basis for estimating the fiscal impacts, the impact on tax revenues and demand for public services (expenditures). Employment growth causes population growth, which in turn feeds into other events, such as retail sales. The increased property value due to the cheese plant is also entered into the spreadsheet to calculate property tax revenues. Fiscal impact analysis does not directly take into account the impacts on expenditures caused by the new firms, such as new infrastructure to meet plant needs, as these tend to be case specific.

Fiscal impacts are estimated only for the operation of the cheese plant in Lubbock County. We cannot predict where in the region the dairies will be located, so fiscal analysis of their impacts is not possible. This does not mean that the dairies will have no fiscal impacts. For example, the representative dairy that we constructed is valued at \$3,776,900. Each dairy would increase the property tax base of the county in which it locates by that amount. It will also increase expenditures in the

jurisdiction in which it locates.

Estimates from the Census Bureau suggest that Lubbock county has declined in population during the last 5 years (from 231,015 in 1995 to 227,890 in 1999). Much of the new employment and earnings rather than noticeably bringing new families into the community may instead keep families in the community who might have left otherwise. This suggests that the overall impact may be stabilizing the community rather than growth per se. Thus, the results can also be viewed as reversing the decline by that amount.

We cannot predict within which cities and school districts in the county the new population, new school-aged children and new businesses will locate. A reasonable assumption is that they will distribute themselves in the same percentages as the current population and businesses. For example, the Lubbock ISD currently has 74 percent of the students, so it is likely that they will receive 74 percent of the new students in the county. If residents and businesses distribute themselves in this way, then the property tax bases and revenues of each district and city would increase by the same percentage as the county increase.

#### **4.2 Fiscal Impacts of Cheese Plant Operations on Lubbock County**

The impact of the operation of the cheese plant was estimated for Lubbock county in order to be able to estimate the fiscal impacts of cheese plant operations on the county. The output, income and jobs created during the operations phase are permanent. The impacts reported below are annual, thus they can be expected annually (once converted to present values) for as long as the plant functions at full operation.

The cheese plant directly creates 125 jobs in the county. An additional 732 jobs are created in the county for a total of 857 jobs (Table 4). These jobs are not all taken by current county residents, some will go to in-commuters and others to new residents in the community. Net in-commuting to the county increases by 116 persons (Table 5). The labor force increases by 614 persons (some of these may be residents who do not currently work) and unemployment declines by 127 persons.

New residents in the community increase population by 935 persons, of these 210 are school-

aged.

The increase in population and incomes result in increased residential property value of nearly \$8 million. This does not imply that the new immigrants are building new houses worth \$8 million. Increased housing demand can cause increases in the value of the existing housing stock, the building of new homes by current residents who sell their existing homes to new residents, and building of homes by new residents.

The commercial property tax base increases by the value of the direct investment, \$95,000,000, and by an additional \$6.7 million dollars (Table 6). Because agricultural land is valued at production value for taxing purposes, its value does not change. The total change in the property tax base is \$109.5 million, which, given a county property tax rate of .1917, results in increased property tax revenues for the county of approximately \$210,000.

Because of the increase in population and employees spending their increased earnings, county retail sales and services receipts increase, resulting in increased sales tax revenues of \$42,000, approximately 3 percent. Overall, county revenues increase \$252,000 annually, approximately .8 percent.

Each dairy that would locate in the county would increase the property tax base by approximately \$3,776,900, and property tax revenues by \$7,240 dollars. The expenditures of the county would also increase for each dairy that locates in the county, but it is difficult to determine by how much.

#### **4.3 Revenue Impacts of Cheese Plant Operations on Cities in Lubbock County**

The majority of the municipal taxable property and taxable retail sales in the county (and in the region) are in the City of Lubbock. General sales tax revenues increase \$96,000 for all municipalities in the county (Table 6). Assuming that all jurisdictions have a hotel occupancy tax of 7 percent, hotel tax revenues increase \$6,000. Total municipal property tax revenues increase approximately \$74,000. Total revenues for cities increase \$176,000.

#### **4.4 Revenue Impacts of Cheese Plant Operations on Special Districts in Lubbock County**

The property tax base increase for both the hospital and water conservation districts is the same as that for the county, 0.2 percent plus \$95 million (Table 6). This results in increased revenues of \$109,000 and 9,000, respectively. As with the county, any dairy that locates would increase the base by \$3,776,900 and revenues by \$3,743 and \$317, respectively. It is difficult to determine how expenditures of these districts would increase for each dairy that locates in the county.

#### **4.5 Revenue Impacts of Cheese Plant Operations on School Districts in Lubbock County**

As noted above, we assumed that property values in all school districts would increase at the same rate as property values in the county. The location of the plant has not been determined and we allocated it to the Lubbock ISD. Across all districts in the county property revenues increase \$1.74 million (Table 6).

Each dairy that would locate in a school district within the county would increase the property tax base of that district by approximately \$3,776,900, and result in increased property tax revenues ranging from a high of \$61,941 for the Shallow Water ISD to a low of \$54,840 for the Lubbock-Cooper ISD. The expenditures of the schools would also increase for each dairy that locates in the county, but it is difficult to determine by how much.

#### **4.6 Impacts of Cheese Plant Operations on Intergovernmental Revenues in Lubbock County**

Another source of revenue for local governments are intergovernmental revenues—revenues from the state and federal governments. The largest of such revenues is the state educational refund to school districts. Given our database, we could only estimate intergovernmental revenues for all uses. Intergovernmental revenues increase by \$454,000 (Table 6).

#### **4.7 Net Fiscal Impacts of Cheese Plant Operations on all Jurisdictions in Lubbock County**

Total revenues for all governmental units in the county increase by \$2.74 million (Table 6). As noted above, given our database, combined expenditures for all jurisdictions in the county are estimated, rather than expenditures by jurisdiction. Total expenditures increase by \$1.464 million. For Lubbock

County the operation of the cheese plant results in a net balance of \$1.275 million in local government revenues.

The fiscal analysis is for one year with the plant in full operation. To calculate the fiscal impact over the life of the plant, present value must be used. All tax revenues and all public expenditures must be converted to present value to calculate the net fiscal impact over the life of the plant. This is because \$10 today is worth more than \$10 five years from now. Over 20 years the present value of increase tax revenues is approximately \$30 million. (Table 7) The net present value of increased public expenditures is approximately \$13 million. The net fiscal impact of the project on the public sector of the county is approximately \$17 million over 20 years.

## Technical Appendices

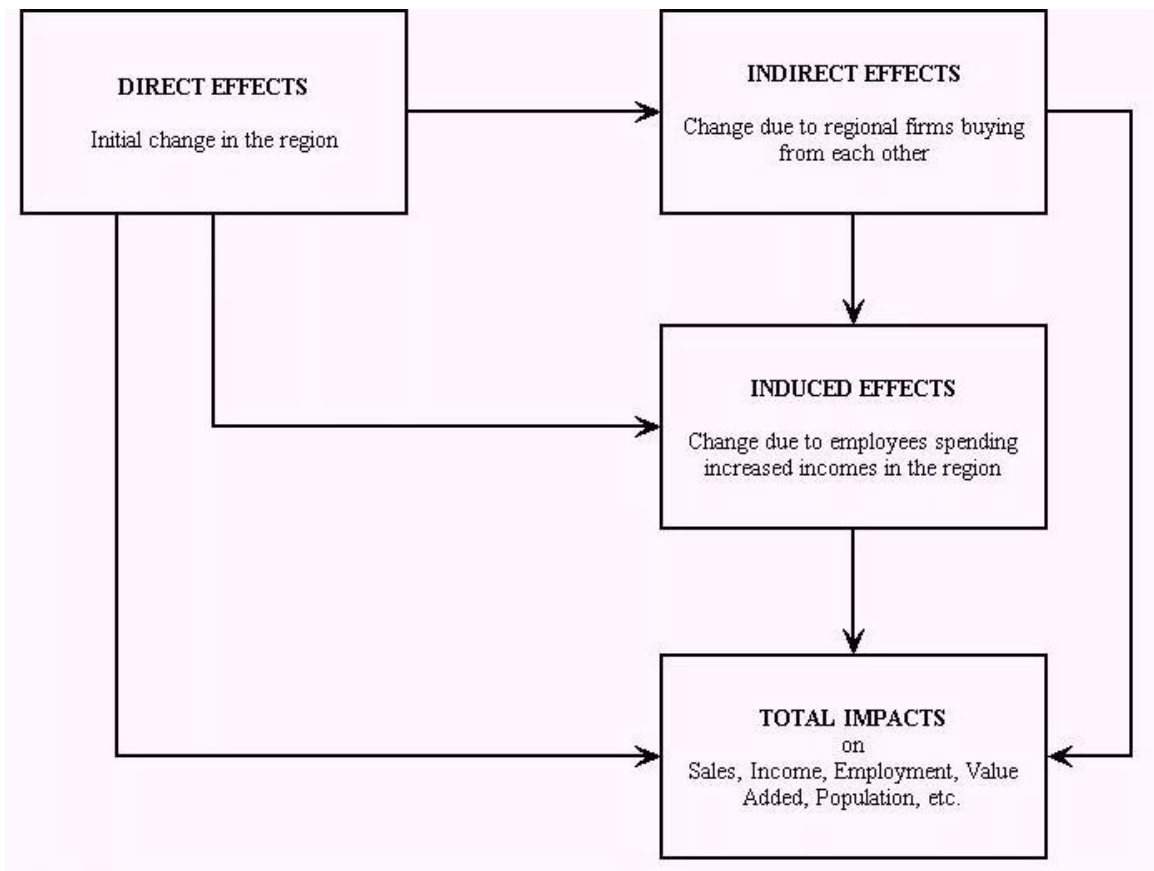
### 1.0 Impact Analysis Technical Appendix

The Model: This report is based on estimations using the SAFE Model, a combination of an input-output model (IMPLAN) and econometric equations, developed by Judith I. Stallmann, Garen Evans, and Lonnie Jones of the Department of Agricultural Economics, Texas A&M University. An input-output model shows the linkages between the sectors in the local economy, that is it shows what percentage of inputs and outputs are bought from and sold to other sectors. The input-output model estimates the economic impacts—output, value-added, jobs, employee compensation and proprietors' income. The fiscal model shows the relation between new jobs and income and local tax revenues and expenditures.

An impact model isolates the effect of the project in the local economy, in this case the cheese plant and dairies, from the rest of the community. To do this the model is run twice, first without the project, which is called the baseline. Then a scenario is constructed with the new project and the model is run again. The difference between the project scenario and the baseline is the impact of the project.

Regional multipliers: As output, employment and income in one part or sector of the local economy increase, that sector will demand (buy) more inputs from other sectors, increasing output, employment and income in those other sectors (Figure 2). Finally the new employees spend their income creating additional output and employment in the sectors where they spend their income. The original increase in output, employment or income is the direct effect on the economy. The resulting increases in output, employment and income in other sectors are the indirect effects. The final effect, caused by employees spending their income, is the induced effect. The three effects are summed for the total effect (Figure 3). The total effect divided by the direct effect is referred to as the multiplier for the community (Figure 4). Each sector has its own multiplier because it has different backward linkages with the rest of the local economy.

**Figure 2: The Multiplier Effect**



**Figure 3: Calculating the Total Effect**

$$\text{Direct Effect} + \text{Indirect Effect} + \text{Induced Effect} = \text{Total Effect}$$

**Figure 4: Calculating the Multiplier**

$$\frac{\text{Total Effect}}{\text{Direct Effect}} = \text{Multiplier}$$

The analysis needs to be interpreted carefully to avoid over estimating impacts on the region. For example, anything that a firm in the region sells within the region is included in regional output, even if the firm merely bought it outside the region and resold it in the region. The way to avoid including items that come from outside the region is to use value-added rather than output.

Value-added counts only the part of output that is added by that sector in the region. It does not include its purchases from outside the region. Labor is generally a major component of value-added. Proprietors' income is also included in value-added. Value-added generally will be a higher percentage of output in sectors that produce a raw material than in sectors that are mainly re-selling, such as retail.

Fiscal Impacts: The increased investment, employment and income will create new tax revenues for the community, but generally will also increase demands on local public services, particularly if new families move to the community to fill the new jobs. These are the fiscal impacts. A common question is whether the new tax revenues will cover the increased demands on local services. Fiscal impacts of the cheese plant operation were estimated for Lubbock County. Fiscal impacts were not estimated for the region because the exact location of the dairies within the region cannot be predicted and fiscal impacts depend on local tax rates, revenues and expenditure patterns.

## **2.1 Cheese Plant Construction Technical Appendix**

In the construction of the cheese plant we used only the direct and indirect effects. The induced effects are long term. Because the construction phase lasts only two years we judged this not long enough for induced effects to be felt.

## **2.2 Dairy Construction Technical Appendix**

The induced effects of the dairy construction are included because construction takes place over a five year period—long enough for induced effects to take place.

Twenty-four dairies are constructed over a 5 year period, or 4.8 dairies per year.

Based on information provided by Elite Milk Producers, dairy construction costs per cow are \$2400 for freestall and \$1000 for dry lot. It is expected that 70 percent of the cows will be in free-stalls.

We constructed a composite dairy that includes 70% of the free-stall costs and 30% of the costs of dry lot. We then multiplied this by 4.8 to obtain the annual dairy investment.

Each dairy is expected to build a 2500 sq. ft. house at \$60 per sq. ft. (\$150,000) and an \$80,000 house for the herdsman.

While the new dairies will purchase land, this land already exists in the region and is not an impact of the project, thus land costs are not included in the analysis.

There was no sector for new farm structures construction in the region for use in the model. We relied on the national model for these data, but adjusted the wage downward from \$29,000 in the national model to \$20,500, based on the local wage in other construction sectors. The residential construction sector was already in the region and uses regional data.

### **3.0 Operations Technical Appendix**

We estimated the data for the cheese plant's linkages with other firms in the region based on secondary data from the California Department of Food and Agriculture and national data for cheese plants.

We used a 10 year average for the price of milk (\$13.34) to take into account the variability in milk prices. Current prices are close to a five year low. Milk prices are from the baseline of Food and Agricultural Policy Research Institute, Department of Agricultural Economics, Texas A&M University, adjusted downward by .50 for the region. We also used the judgement of Dr. Bud Schwart, Extension Dairy Economist, for the five year average price of bull calves (\$30 per head), culled cows (\$418 per head) and excess heifers (\$1150 per head).

As in the construction phase, we constructed a composite dairy. In the composite dairy 70% of the cows are free stall and produce 72 pounds of milk per day and the remaining 30% produce 68 pounds of milk per day. The composite dairy produces 64,605,000 pounds of milk. Using the five year average milk price of \$13.34 per cwt., the annual value of milk for the composite dairy is \$8,618,307. The value of animals sold is \$744,174. The total value of output for the composite dairy, \$9,362,481, was multiplied by 24 to calculate the annual dairy output in the region.

#### **4.0 Fiscal Impacts Technical Appendix**

##### **4.1 Fiscal Impact Analysis Technical Appendix**

It is important to point out that the database with which we are working divides public expenditures by function—police, roads, health, etc.—but it does not divide it by political jurisdictions—county, cities, school districts. Thus, we cannot estimate expenditures by these jurisdictions; we can only estimate total expenditures and then allocate expenditures by functions. Because of this, the total revenues and total expenditures may not balance. But the most important information is the impact of the project on the balance—does it improve the balance or not—rather than focusing on the overall totals.

The fiscal analysis is for one year while the plant is in full operation. To calculate the fiscal impact over the life of the plant, present value must be used. Present value converts all future revenues and expenditures to current dollar values. For example, the present value of all tax revenues has to be calculated in order to be able to compare tax revenues across years. This is because \$10 today is worth more than \$10 five years from now. Most people assume that this is because of inflation, but it is really because \$10 today can be invested and 5 years from now will be worth more than \$10. So net present value tells us what \$10 dollars some years in the future is equivalent to in today's dollars. For example, the promise to receive \$10 three years from today is worth about \$7.50 today, at a 10% rate of interest. All tax revenues and all public expenditures must be converted to present value to calculate the net fiscal impact over the life of the plant.

##### **4.2 Fiscal Impacts of Cheese Plant Operations on Lubbock County Technical Appendix**

The total economic impacts reported for the county of Lubbock cannot be subtracted from the totals reported for the region to determine the impact in the rest of the region. This is because when the region is estimated it includes both the cheese plant and dairies, each with a separate wage rate and a set of linkages to the local economy. When the model is estimated for Lubbock county it contains only the cheese plant with its relatively high wage rate. In addition the linkages of the cheese plant are weaker when restricted to the county than to the region. For example, in the regional model the cheese plant is linked to all the dairies in the region, but it can only link to dairies within the county in the county model.

We allocated the new jobs on the basis of one job per person. The jobs go to the increase in the labor force and the in-commuters. Any remaining jobs are allocated to the unemployed. If one person holds more than one job, there will be fewer people leaving unemployment.

The fiscal impacts do not include any capacity constraints that might arise because of growth and that would require additional capital investment to expand capacity.

We cannot predict where in the county new residents and new businesses will locate. We allocated them based on existing distributions of population, property values and taxable retail sales and then applied the applicable tax rates. We followed a similar process for students and school districts.

We cannot predict where in the region the dairies will locate. Each dairy will increase the property tax base of the taxing jurisdiction within which it locates by approximately \$3,776,900. The impact of each dairy on other tax revenues and on county, municipal, school district and special district expenditures cannot be predicted without knowing their location.

To estimate the net present value of the fiscal impact we used a discount rate of 6%. The value of the cheese plant entered the tax rolls over a two-year period. The cheese plant operations phase in over 5 years. Sales and hotel and motel tax revenues and all public expenditures were phased in accordance with the five-year phase-in of the cheese plant.