The University of Georgia

Center for Agribusiness and Economic Development

College of Agricultural and Environmental Sciences

Polk County Dairy Feasibility Analysis

Prepared by: Kent Wolfe and Mike Best
Feasibility Report 05-01
February, 2005

TABLE OF CONTENTS

Introduction....1

Fresh Fluid Milk Market Analysis.... 1

Demographics.... 3

Product Consumption....6

Purchase Frequency....7

Container Preferences....8

Purchase Location....9

Milk Prices....10

Likelihood to Purchase Milk....11

Purchase Preference and Price....12

Product Feature Ratings....13

Survey Conclusions....14

Estimating Polk County Area Fluid Milk Market Potential....14

Likelihood to Take Farm Tour....17

Financial Analysis....19

Financial Evaluation....20

General Financial Numbers in Dairy Processing....20

Break-even Analysis....23

Market Potential and Financial Break Even Analysis Comparison....25

Conclusion....25

Introduction

The Center for Agribusiness and Economic Development (CAED) was contacted by Polk County, Georgia to evaluate the feasibility of constructing an on-site processing facility to produce milk for the local market. The CAED, working with the local highschool's DECCA club, developed and administered a survey to area residents to gauge their interest and willingness to purchase locally-produced milk products.

Fresh Fluid Milk Market Analysis

Fluid Milk Market - - Retail sales of fluid milk increased 0.3% in 2003. This was accomplished in spite of a small decline in per capita consumption. The product sales mix changed slightly. In 2003, whole milk sales decreased 0.9% while flavored low-fat increased by 4.3%.

Several factors have influenced the growth in milk sales. One factor pertains to improvement in the product package. The appearance of milk packaging, coupled with improved labeling content, account for some of the increase. Another factor is the growth in the coffeehouse industry offering specialty coffee beverages. These specialty coffee beverages may contain between 50 to 90 percent milk. These two factors, combined with the milk industry promotion, have all contributed to the increase in milk consumption (source: *Milk Facts,*1997).

Fluid Milk Market Outlets - - Supermarkets and grocery stores account for roughly 82% of fluid milk sales. Mass merchandise stores accounted for an additional 8.2% of milk sales. Another 5.6% was sold through warehouse clubs with the remaining sales through drug stores, convenience stores, and all others.

Fluid Milk Consumption Trends - - Per capita consumption of fluid milk has declined from 29.8 gallons in 1970 to 21.7 gallons in 2003. This includes consumption of plain and flavored milk, whole, low-fat, and fat-free milk products and buttermilk. Along with the decline in fluid milk consumption, the product mix consumption patterns have changed significantly over the past 30 years. Per capita whole milk consumption has fallen from 24 gallons in 1970 to 7.5 gallons in 2003. During the same period, per capita consumption of low-fat/skim products has increased from 5.1 gallons in 1970 to 13.8 gallons in 2003. The trend for flavored milk has increased over the same time period, but the increase is less dramatic (10 gallons in 1980 to 14.0 gallons in 2002).

Fresh Milk and Cream Consumer Profile: Target Market - - The following fluid milk customer profile was created using the 1991 Consumer Expenditure Survey data collected by the Bureau of the Census. The information contained in Table 1 includes plain and flavored fresh milk and cream. The survey respondents kept a two-week diary on small, frequently- purchased products. These figures include expenses for food and beverages, both at home and in restaurants. The diary approach is intended to capture expenditures that respondents are likely to forget or recall incorrectly over long periods of time. More product-specific information was not available. Thus, these results should be used as a generalization of milk and cream consumers.

- The fluid milk and cream consumer is married, has children between the ages of 6 and 17, is between 35 and 44 years of age, and has an annual household income in excess of $40,000.

- Milk consumption peaks between the ages of 13 and 17 years of age (27.9 gallons per capita) and the volume per capita decreases after school years, but stabilizes after age 35 (between 9.5 and 11.1 gallons per capita).

- On average, consumer units/households spend $136.00 in 2001 annually on fresh milk and cream products.

Table 1

Fluid Milk Consumption Breakouts by Demographic Variables [1]
(Results are based on indexed average expenditures where 100 is the average expenditure of all consumers and the percent reported in the tables shows the percent difference from the average expenditure)

Indexed Marital and Children Status Break Out							
Year	Married	Single persons	Married w/ children	Married w/out children	Married w/ oldest child <6	Married w/ oldest child 6-17	Single Parent w/ child <18
1991	24%	- 37%	45%	-12%	35%	58%	12%
Indexed Age Break Out							
Year	<25	25<35	35<45	45<55	55<64	65<74	75+
1991	-44%	7%	26%	6%	-6%	-15%	-24%
Indexed Income Break Out (in tens, add 000)							
Year	<$10	$10<$20	$20<$30	$30<$40	$40<$50	$50+	
1991	-28%	-8%	-5%	7%	27%	22%	
Total Annual Fluid Milk Expenditures by Age Group[2]							
Year	<25	25<35	35<45	45<55	55<64	65<74	75+
1991	$71.84	$137.81	$163.50	$137.17	$121.09	$109.77	$97.86

[1]The data in Table 1. were taken from the Official Guide to Household Spending, 2nd edition, conducted annually by the Bureau of the Census, (1991).
[2] The average price includes all respondents, not just those who purchase a product, thus the average price may underestimate the amount spent by purchasers.

Demographics

The data in Table 2 provide insight into the demographics of the people interviewed for this study. Not surprisingly, the majority of the respondents were female (64%) and middle-aged. The typical respondent can be described as a white, 34-year-old female with at least a high school education and an average household income of $62,000 annually.

These demographics align fairly closely with the Polk County Census Demographic Data. The respondents are significantly more likely to be female than the general population but that is expected given that females are more likely to purchase food products for the household than males. The racial composition of the respondents is similar to that of the general Polk County population. The respondents are under represented in terms of Hispanic people. The respondents are significantly more affluent than the general population of Polk County. The average age of the respondents is similar to the average age of the county population.

Table 2. Demographic Profile		
Demographic	**Percent**	**Percent (Polk County)**
Gender		
Male	36%	49.2%
Female	64%	50.2%
Children in Household	1.69	
Adults in Household (>18 yrs.)	2.07	2.66
Education		
< Highschool	25%	37 %
Highschool/GED	31%	35 %
Some college/technical degree/associate	22%	17 %
Bachelors	6%	3 %
Some graduate work	4%	4 %
Advanced degree/professional degree	12%	4 %
Primary Food Shopper		
Female head of house	77%	
Male head of house	21%	
Someone else	2%	
Age	34.00 Years	35.10 Years
Race		
White	85%	80%
Black	11%	13%
Asian	1%	0.3%
Hispanic	1%	8%
Multi-racial	2%	NA
Household Income		
< $14,000	3%	
$15,000 -- $24,999	5%	
$25,000 - $34,999	7%	
$35,000 - $49,999	11%	
$50,000 - $74,999	24%	
$75,000 or more	18%	
Don't know/ Do not want to answer	32%	
Mean	$75,500 +	$32,328

Market Analysis

Product Consumption

To gauge interest in local demand for fluid milk products, it is important to determine the types of milk products being purchased and consumed in the area. The information presented in Table 3 reveals that flavored milk, plain whole milk, and 2% milk are the most popular fluid milk products with regard to stated consumption and purchases. Interestingly, flavored milk, most likely chocolate, is the most frequently purchased and consumed milk as reported in the survey. The dairy may want to produce a flavored milk product to take advantage of this ready-made market.

The data in Table 3 suggest that by producing three fluid milk products, the dairy can capture a significant percentage of the milk being consumed in the area. The market for buttermilk, skim milk, and low-fat milk are small relative to the other products and may not warrant the cost associated with bringing these products to market.

Table 3. Fluid Milk Product Consumption and Purchase

Milk Product	Drink These Milk Products	Buy These Milk Products
Flavored Milk	61%	60%
Plain Whole	56%	53%
Reduced Fat (2%)	51%	46%
Buttermilk	25%	29%
Fat Free (skim)	25%	22%
Low-fat (1%)	15%	14%

Purchase Frequency

Another important aspect of estimating market potential is to estimate the frequency of when products are purchased. Having an estimate of purchase frequency allows for a more realistic market potential determination.

As with the reported purchase and consumption data in Table 3, the most frequently purchased fluid milk products are flavored, plain whole, and 2% milk. These products are purchased significantly more frequently than the remaining products. Flavored milk appears to be purchased about every two weeks where as plain whole milk is more likely to be purchased weekly. This difference may lie in the fact that milk is a household staple that is used in breakfast and other meal preparations as well as being served as a meal-time beverage. Flavored milk, on the other hand, is generally used as a beverage.

The data in Table 4 suggest that the plain whole milk will turn over faster than any of the other milk products, followed by 2% milk.

Table 4. Frequency of Purchasing Milk Products

Milk Product	Never	< Once a Week	Weekly	Every 2 weeks or more
Flavored Milk	21%	12%	21%	46%
Plain Whole	33%	17%	40%	10%
Reduced Fat (2%)	41%	15%	30%	15%
Buttermilk	56%	4%	8%	31%
Fat Free (skim)	64%	11%	18%	7%
Low-fat (1%)	78%	2%	10%	11%

Container Preferences

The old adage, "It is easier to sell something that people want than it is to sell something that is easy to produce," is relevant to the fluid milk market. People are more willing to purchase a product if it is packaged in a manner that suits their particular needs. For instance, if a family only uses a ½ gallon of milk per week, they will be unlikely to purchase milk by the gallon if they have the choice of purchasing it in a ½ gallon container. Therefore, the dairy needs to understand the packaging preferences of potential consumers so that they can package their product in the most desirable manner.

The results in Table 5 indicate that a gallon container is the most commonly purchased container for plain whole and 2% milk. The gallon container is purchased significantly more often that the other container sizes for these two milk products. Interestingly, this does not hold as true for flavored milk, one of the more popular fluid milk products. Flavored milk is more likely to be purchased in ½ gallon containers (38%) than in gallon containers (30%). This suggest that the dairy should offer flavored milk in two container sizes to best access the flavored milk market.

To access the school milk market, the milk has to be packaged in a ½ pint container.

Table 5. Most Frequently Purchased Milk Container

Milk Product	Gallon	½ Gallon	Quart	Pint
Plain Whole	71%	17%	4%	2%
Reduced Fat (2%)	72%	23%	3%	2%
Low-fat (1%)	55%	32%	7%	7%
Fat Free (skim)	61%	23%	11%	4%
Buttermilk	21%	51%	19%	9%
Flavored Milk	30%	38%	15%	18%

Purchase Location

To access the fluid milk market, it is important to determine where potential consumers are most likely to purchase milk products (Table 6). The survey asked respondents where they purchased their milk products. Not surprisingly, the supermarkets were the retail outlets where most of the fluid milk products are purchased. However, it was noticeable that only a small amount of fluid milk was reportedly purchased at convenience stores. The dairy should focus its marketing efforts on the grocery store/supermarket marketing channel and not worry about the convenience store and mass merchandise outlets. These outlets only represent a small proportion of milk sales as reported by the respondents. The only exception may be flavored milk products.

Table 6. Retail Outlet Where Milk is Purchased

Milk Product	Supermarket	Convenience	Mass Merchandise	Other
Plain Whole	93%	5%	0%	2%
Reduced Fat (2%)	91%	6%	2%	1%
Low-fat (1%)	82%	6%	6%	6%
Fat Free (skim)	84%	11%	2%	3%
Buttermilk	91%	6%	0%	3%
Flavored Milk	79%	15%	2%	3%

Milk Prices

This is probably one of the most important questions marketers need to answer before introducing a new product into the market place. What are consumers currently paying, or what do they think they are currently paying for products they purchase? The data in Table 7 reveal that consumers are paying an average of $3.56 for a gallon of plain whole milk. The prices they are paying for the other milk products do not vary significantly, with the exception of buttermilk which costs about $2.96 per gallon. Similarly, the prices for ½ gallon containers of milk products are in the $2.30-$2.70 range. These prices may vary due to the respondent's inability to accurately recall the prices they are paying but they offer a good estimation of product pricing. The exception is buttermilk, which appears to be significantly less expensive than the other milk products.

Table 7. Prices Paid for Fluid Milk by Container

Milk Product	Gallon	½ Gallon	Quart	Pint
Plain Whole	$3.56	$2.42	$1.50	$1.29
Reduced Fat (2%)	$3.67	$2.31	$2.25*	$1.89*
Low-fat (1%)	$3.46	$2.36	$1.79*	$1.75*
Fat Free (skim)	$3.47	$2.68	$2.31*	$2.00*
Buttermilk	$2.96	$2.17	$1.80*	$1.58*
Flavored Milk	$3.30	$2.44	$1.73	$1.28

* Small sample size (<10 respondents); results may be unreliable.

Likelihood to Purchase Milk

The survey respondents were asked how likely they would be to purchase locally-produced fluid milk in supermarkets, convenience stores, or wherever they shop. It is important to gauge purchase intent when considering a new product introduction. The results indicate that, on average, the respondents were "somewhat likely" to purchase locally-produced milk. Another measure to consider is the median value or response to the question. The median value re-enforces the data in the table and suggests that area residents are somewhat likely to purchase premium, locally-produced milk.

Table 8. Likelihood to Purchase Locally Produced Milk	
Likelihood	**Percent (n=266)**
Very Likely (5)	28%
Somewhat Likely (4)	36%
Neutral (3)	15%
Somewhat Unlikely (2)	9%
Very Unlikely (1)	12%
Mean	3.58
Median	4.00

Over one-quarter (28%) of the respondents indicated they were very likely to purchase a premium milk product, l with an additional 36% reporting they would be somewhat likely. It has been proven through research that stated purchase intentions do not match with actual purchase behavior. To address this issue, the data can be adjusted to reflect industry standardization of these responses. According to industry research, it is assumed that 80% of respondents reporting they are likely to purchase a product actually follow through. The percentage falls to 60% for those that respond somewhat likely.

Adjusting the data in Table 9 reveals a more realistic purchase intent. After the adjustment, it is estimated that 44% of the respondents would follow through and purchase a locally-produced milk product.

Table 9. Adjusted Likelihood to Purchase Locally-Produced Milk		
Response	**Actual Response**	**Adjusted Response**
Very Likely	28%	22%
Some what Likely	36%	22%
Total	64%	44%

Purchase Preference and Price

The respondents were asked whether they would be willing to purchase a locally-produced premium milk product instead of their usual milk. Nearly three-quarters (72%) indicate that they would purchase a locally-produced premium milk over the milk they are currently purchasing. However, this question does not get at the pricing of the local milk. A question was asked to determine the respondents willingness to pay more for the locally-produced premium milk. The results are encouraging in that 24% of the respondents indicated they would be willing to pay more for a locally-produced premium milk product.

Table 10. Willingness to Purchase and Pay More for Premium Milk Product

Response	Purchase Premium Milk Product	Willing to Pay More
Yes	72%	24%
No	28%	76%

Given the significant number of respondents that are willing to purchase milk products, it is important to derive an estimate of how much more they are willing to pay. If area consumers are not willing to pay more for locally-produced milk, allowing the dairy to cover the cost of producing the milk, the project will not be economically feasible.

A question was asked of those respondents who were willing to pay more for locally-produced milk to determine how much more, as a percentage, they were willing to pay. Interestingly, respondents are willing to pay between ten and nineteen percent more for locally-produced milk.

Table 11. Additional Percentage Willing to Pay for Locally-Produced Milk

Likelihood	Percent (n=57)
0-9%	40%
10%-19%	26%
20%-29%	11%
30%-39%	12%
40%-49%	5%
50% or more	5%
Mean	10%-19%
Median	10%-19%

However, there are a number of respondents that are willing to pay between zero and nine percent more for locally-roduced milk. When viewing this range, it is important to remember

that only those who indicated they were willing to pay more answered this question. Therefore, it is assumed that a premium milk product could demand a premium of about 15% on average.

Product Feature Ratings

Marketing products requires understanding the consumer and what perceptions they have regarding specific products. Respondents were asked to rate the following product features in terms of their importance in influencing milk purchase decisions. The following results indicate that the respondents rank the price of milk as being a very important factor in their decision to purchase milk products. However, consumers always express concern when product pricing is involved.

"Farm fresh" was rated significantly higher with regard to influencing their purchase decision than the other non-price product features. This is encouraging and is consistent with the Georgia Grown study results. The dairy may want to incorporate the term "Farm Fresh" in the packaging and promotion of any future milk products. The "Farm Fresh" phrase elicits the thought of local production and therefore being fresher and better than products that are produced and shipped from outside the area. This especially holds true for perishable products.

Table 12. Importance of Product Attributes in Purchase Decision

Feature	% Very Important	% Somewhat Important	Average
Price	52%	24%	4.17
Farm Fresh	*30%*	*25%*	*3.41*
National Brand Name	22%	24%	3.21
Produced in Georgia	22%	20%	3.11
Store Brand Name	13%	19%	2.82
Produced on a Family Farm	14%	22%	2.80
Locally Produced	15%	15%	2.77

If they do not use BST, "All Natural" can also be added to the label. This has provided for additional premiums from a nutritional standpoint.

Survey Conclusions:

The results from the survey indicate that a significant number of the respondents are interested in purchasing a premium locally-produced milk product. In fact, nearly a quarter of the respondents indicated that they would be willing to pay more for a locally-produced premium milk product.

On average, the respondents are willing to pay about 15% more for a premium milk product. However, stated willingness to pay may not accurately reflect the consumer's true willingness to pay when they actually are faced with a purchase decision.

The dairy should focus on producing whole milk, 2%, and flavored milk products. These products were reported to be consumed and purchased most frequently. The most popular container size is the gallon container and fluid milk is most likely to be purchased at a supermarket or grocery store.

Estimating Polk County Area Fluid Milk Market Potential

The principles of determining market share and market potential are the same for all geographic areas. First, determine a customer profile (who) and the geographic size of the market (how many). This is the general market potential. Knowing the number and strength of your competitors (and then estimating the share of business you will take from them) will give you the market potential specific to your enterprise. Using this approach, the estimated market potential for fluid milk consumption in Polk County as well as a 30 mile radius around the dairy is shown in Table 13.

Table 13. Polk County Estimated Fluid Milk Consumption by Age (Reported in Gallons Per Capita)

County - Polk County (Total population in 2004 = 39,581)			
Age Breakout	**County Population Figures 2004 Census**	**Gallons Consumed Per Capita***	**Annual Consumption (Gallons) by Age**
Less than 6 yrs.	3,292	28.4	93,493
6 - 12 years	3,405	25.5	86,828
13-17 years	3,555	23.5	83,543
18-34 years	9,137	12.1	113,299
35-49 years	8,657	10.5	90,898
50-59 years	4,547	8.9	40,468
60+ years	6,989	8.0	55,912
Total Estimated Annual Per Capita Consumption of Fluid Milk in Gallons for Polk County			564,440

* Age group per capita consumption figures were taken from NFO Research Inc. published in the International Dairy Foods Association's *Milk Facts,* 2003.

Based on the estimated fluid milk consumption for Polk County, there appears to be sufficient volume to allow the dairy to enter the market. Using the adjusted willingness to purchase a premium locally-produced milk product figure of 44% found in Table 9, it is possible to obtain a better estimate of what the dairy might be able to sell.

Forty-four percent of approximately 560 thousand gallons of milk annually equates to 248,354 gallons. Assuming that the dairy can capture 10% of this potential, the dairy ***could potentially sell 25*** **thousand gallons of fluid milk** annually in Polk County. These figures are based on accessing consumers residing within a 30 mile radius of the dairy.

Estimated Market Potential, Polk County:

564 Thousand gallons of fluid milk consumed annually
x 44% of respondents would purchase locally produced premium milk
248,354 thousand gallons of fluid milk market potential

Assuming the dairy can capture 10% of the state market potential the dairy could potentially sell 24,835 gallons of fluid milk in Polk County. Assuming that the milk can be sold for $4.10 per gallon, the stated current price consumers are paying plus the 15% average premium they are willing to pay, the dairy's total revenue is estimated at $101,825 annually on sales of 248 thousand gallons of milk.

Gallons Sold		**Price Per Gallon***		**Total Estimated Revenue**
24,835	X	$4.10	=	$101,825

* Retail price per gallon for plain whole milk from Table 7 plus the average stated premium of 15% (Table 11).

This retail revenue estimate assumes that the dairy can produce the 25 thousand gallons per year and that all sales are of plain whole milk by the gallon. However, the dairy will receive a wholesale price for their milk products if they sell through established retail outlets and not directly off the farm.

Gallons Sold		**Estimated Wholesale Price Per Gallon***		**Total Estimated Revenue**
24,835	X	$3.28	=	$81,460

* 80% of retail price per gallon for plain whole milk from Table 7.

Assuming the dairy is able to produce and sell roughly 25 thousand gallons of milk, it can expect to earn a total of $81,460 annually. This represents the total revenue with no deductions for cost of production and marketing.

Table 14. Estimated Fluid Milk Consumption for 30 Mile Radius Around Dairy

(Reported in Gallons Per Capita)

(Total population in 2000 = 1,452,538)

	Polk County Population	Gallons Consumed Per Capita**	Polk County Fluid Milk Consumption
Age Breakout	2000*		2000*
Less than 6 yrs.	127,977	24.8	3,634,547
6 - 12 years	128,905	25.5	3,287,008
13-17 years	122,331	23.5	2,874,779
18-34 years	374,273	12.1	4,640,985
35-49 years	342,323	10.5	3,594,391
50-59 years	233,978	8.9	2,082,404
60+ years	122,751	8.0	982,008
Total Estimated Annual Per Capita Consumption of Fluid Milk in Gallons			21,096,192

* 2005 population by age group is not currently available. Therefore, population is estimated using 2000 census population estimates.
** Age group per capita consumption figures were taken from NFO Research Inc. published in the International Dairy Foods Association's *Milk Facts*.

Based on the estimated fluid milk consumption for an area covering a 30 mile radius from the dairy, there appears to be sufficient volume to allow the dairy to enter the market. Using the adjusted willing to purchase a premium locally-produced milk product figure of 44% found in Table 9, it is possible to obtain a better estimate of what the dairy might be able to sell.

Forty-four percent of approximately 21 million gallons of milk annually equates to 9,282,324 million gallons. Assuming that the dairy can capture 1% of this 10 million gallon potential, the dairy ***could potentially sell 1 million*** **gallons of fluid milk** annually. These figures are based on accessing consumers residing within a 30 mile radius of the dairy.

Estimated Market Potential:

21 million gallons of fluid milk consumed annually
x 44% of respondents would purchase locally-produced premium milk
9,282,324 million gallons of fluid milk market potential

Assuming the dairy can capture 10% of the state market potential. the dairy could potentially sell 928,232 million gallons of fluid milk in the defined market area. Assuming that the milk can be sold for $4.10 per gallon, the stated current price consumers are paying plus the 15% average

premium they are willing to pay, the dairy's total revenue is estimated at $3.8 million annually on sales of 928 thousand gallons of milk.

Gallons Sold		Price Per Gallon*		Total Estimated Revenue
928,232	X	$4.10	=	$3,805,753

*Retail price per gallon for plain whole milk from Table 7 plus the average stated premium of 15% (Table 11).

This revenue estimate assumes that the dairy can produce the one million gallons per year as well as sell it all in gallon containers.

Gallons Sold		Price Per Gallon*		Total Estimated Revenue
928,232	X	$3.28	=	$3,044,602

* 80% of retail price per gallon for plain whole milk from Table 7.

Assuming the dairy is able to produce and sell roughly one million gallons of fluid milk, it can expect to earn a total of $3.04 million annually. This represents the total revenue with no deductions for cost of production and marketing.

Likelihood to Take Farm Tour

The survey respondents were asked how likely they would be to participate in a farm tour of a working dairy. The results indicate that, on average, the respondents were somewhat likely to participate in a working dairy farm tour. The catchphrase, "Build it and they will come," does not necessarily apply. Therefore, it is important to gauge interest in an agritourism operation before starting. The median response to likelihood of participation reinforces the data in Table 15 and suggests that area residents are somewhat likely to participate in the working dairy tour.

Table 15. Likelihood to Participate in a Working Dairy Farm Tour	
Likelihood	**Percent (n=267)**
Very Likely (5)	24%
Somewhat Likely (4)	39%
Neutral (3)	14%
Somewhat Unlikely (2)	8%
Very Unlikely (1)	15%
Mean	3.49
Median	4.00

Approximately one-quarter (24%) of the respondents indicated they were very likely to take a working dairy farm tour with an additional 39% reporting they would be somewhat likely. It has been proven through research that stated purchase intentions do not match with actual purchase behavior. To address this issue, the data can be adjusted to reflect industry standardization of these responses. According to industry research, it is assumed that 80% of respondents reporting they are likely to purchase a product actually follow through. The percentage falls to 60% for those that respond somewhat likely.

Adjusting the data (Table 16) reveals a more realistic purchase intent. It is estimated that 42% of the respondents would follow through and participate in a working dairy farm tour.

Table 16. Adjusted Likelihood to Participate in a Working Dairy Farm Tour		
Response	**Actual Response**	**Adjusted Response**
Very Likely	24%	19%
Somewhat Likely	39%	23%
Total	63%	42%

Financial Analysis

Financial Evaluation

Due to a limited amount of information about potential markets for the dairy at this time, and the drastic differences in equipment costs for small-scale dairy processing and bottling, a very broad financial evaluation is being presented. The evaluation attempts to present some general directions of start-up, variable, and operating costs for some given scenarios. It also provides a general indication of the market requirements (sales) for operating at a break-even level. The general format for this evaluation was developed through a computerized spreadsheet and revisions can be made to better model potential outcomes as more and better information becomes available.

General Financial Numbers in Dairy Processing

Determining financial projection in the dairy processing industry is extremely difficult. This is due to the wide range in the costs and profitability between individual firms within the industry. This range is attributed to the economies of scale associated with milk processing and bottling, and a firm's ability to penetrate the market.

The dairy industry ranges from extremely large, low-cost processors to small, high-cost processors who utilize niche markets in order to provide the firm with the necessary gross margin to stay in business. The large, low-cost processors normally produce on a small profit margin with the volume decreasing their fixed costs per unit and giving them a competitive advantage. The smaller producers develop the niche market through packaging (glass bottles), taste, or some other form of product differentiation. It is also important to understand that processors who market retail products attempt to increase the number of product lines they sell in order to better penetrate the market.

Since most raw milk costs the same for the processors, the only way for a small firm to pay for the increased cost of processing their milk is to pass that cost on to the consumer in the form of a higher price. This requires the producer to find the market that provides for the larger gross margin needed. For this analysis, it was assumed that the processor/dairy paid the dairy enterprise the current market value for the raw milk being processed. If the dairy processed the raw milk instead of selling it, it is giving up the opportunity to sell the milk at the current market rate, and thus is an opportunity cost for the entire farming operation.

Costs associated with processing a gallon of milk include raw milk (an opportunity cost to the dairy), labor, supplies and packaging, utilities, and physical plant (building and equipment). Currently, raw milk prices are around $18.00 per hundred weight or around $1.55 a gallon. These costs have varied greatly during the last two years with the range being between $12.00 and $22.00 per hundred weight.

Labor costs generally go up per gallon as the plant size decreases. Labor costs for medium to large size plants range from $.07 to $.17 per gallon. We are assuming a labor cost of $.20 per gallon for this facility. Labor costs have been shown to vary more with plant efficiency than wage range.

Packing supplies generally range from $.07 to $.10 for containers assuming sufficient plant size for them to be blown on site. Due to the small size of the plant under consideration, it was assumed that container cost would be around $.20 from the higher shipping costs for bringing in the containers.

Utility costs vary depending on location and plant efficiency. On a per gallon basis they range from just under $.02 to $.0425, so a very conservative estimate of $.05 a gallon was used for this analysis.

Plant costs are difficult to estimate due to the variation in the costs of the plants already in production and the different depreciation methods used by those firms. The cost of a building and equipment for processing milk can range from $250,000 into the millions, depending on the efficiency of the equipment and whether it is new or used. For this analysis, three different plant costs will be considered. An example of the processing and bottling system that is on the high-cost end is demonstrated below in Table 17.

Table 17. Start-up requirements for milk processing and bottling	
Equipment and estimated costs necessary for fluid milk processing	Cost
1. Raw Milk Silo	$50,000
2. Separator/Clarifier/Standardizer	$250,000
3. High temperature/short time pasteurizer on skid	$225,000
4. Homogenizer	$150,000
5. Intermediate Storage Tanks	$50,000
6. Filler (half and full gallon)	$100,000
7. Code Dater	$10,000
8. Chiller	$40,000
9. Pumps & Valves and Misc. Plumbing	$125,000
10. Casers, Stackers, and Conveyers	$200,000
11. Refrigeration Storage	$100,000
12. CIP System (Cleaning)	$40,000
10. Installation	$300,000
Approximate Total	$1,640,000
As discussed with John Wandryk of Crouch Engineering, Fort Worth, TX and Ginny Mathis, Crouch Dairy Systems, Knoxville, TN	

It is important to note that the above costs do not include the cost of constructing a building for both retailing the milk product and one for processing the milk product. It should also be noted that the type of building used for processing must meet a 3A hygienic standard which makes it more expensive to build.

Additional costs that must be considered are the cost of marketing the processed milk. This would include both the physical aspects of getting the milk to the marketplace as well as promotional considerations as well. However, if the processor chooses to sell the milk on-site, then a delivery system would not be required. These costs can be significant for the smaller producer and range from a low of $.04 a gallon to $.30. It will be assumed for this analysis that the milk is to be sold at a farm store, on-site, and that there is no promotional budget.

Break-even Analysis

The break-even analyses presented here are based on a number of cost estimates and random price variations for the retail products. Given the very limited amount of information and production "specifics" available to conduct this analysis, three different analyses of costs were made - referred to as the “over-estimate,” “estimate,” and the “under-estimate.” First, best estimates were made in the process design and assignment of costs for the processing equipment. After receiving a range of estimates, the high and low were averaged to come up with the “estimate”. The high was used for an "over-estimate" with the low being used for the “under-estimate.” The processing and retail facilities’ cost was also estimated and then a twenty-percent cushion was added for the “over-estimate” and subtracted for the “under-estimate.”

START-UP COST ESTIMATES:

Retail Facility $80,000.00
Processing Facility Construction $100,000.00
Milk Processing Equipment..... $880,000.00

Similarly, annual costs to run the retail shop were assumed to be $43,000 (estimate). The high and low estimates were $51,600 and $34,400 respectively which came from a twenty percent buffer on each side of the estimate. Estimates were also made on a per unit (gallon) basis for on-farm processing and co-packing for milk utilizing the expected production level of the farm of 100,000 gallons per year.

PER UNIT COST ESTIMATES (including estimates for overhead):

Annual Retail Facility Overhead……...$43,000.00
On-Farm Milk Processing…….$2.00/gallon

The estimates for the start-up costs were derived from a combination of sources. Similarly, per unit cost estimates were also based on best guesses and available data. While useful, the cost estimates here should be used only as a direction rather than an exact representation. Co-packing was another option that was looked at for small dairy producers instead of on-farm processing. For this study, co-packing was defined as having the raw milk processed and bottled by another off-farm processor, while preserving the identity of the milk product. It ends up that co-packing prices were impossible to obtain because no other processors wanted to deal in the small quantities that would come from a 50 to 100 cow herd, while keeping the identity of the milk.

The break-even charts that follow provide information on quantities needed to break even at different retail price levels. The break even represents the quantity (gallons) of milk that must be sold to cover the estimated annual cash repayment on start-up costs, the estimated annual operating costs for running the retail outlet, and the estimated per unit cost of production.

According to the break-even tables, it is obvious that to be competitive with existing dairy product prices, at a sales price of $3.50/gallon, somewhere between 33,000 and 234,600 gallons of Applicant's Farm milk must be sold each year to break even. At higher sales prices ($4.00, $4.50, & $5.00 per gallon), fewer total units must be sold to break even. However, historically, the market potential tends to decrease as the sales price gets higher.

For an assumed 100,000 gallons of milk processed and sold each year, we also calculate the break-even price. For the over-estimate in equipment costs the break even price would be $4.98. For the estimate and under-estimate, the break-even price would be $3.61 and $2.22 respectively. These prices are all well within the current market for milk in Georgia with the price for a gallon of milk at the retail level being between $3.50 at Walmart and $5.03 at Pet. However, the current milk market is volatile and these current prices may not hold long enough for decision-making purposes and historical prices should probably be utilized.

BREAK- EVEN ANALYSIS
---MILK--

OVER-ESTIMATES

Table 18. Break- Even Sales for Processed Milk

Sales Price Unit Cost	**$3.50/Gallon**	**$4.00/Gallon**	**$4.50/Gallon**	**$5.00/Gallon**
$2.40 Fresh	**234,603 gal.**	**161,290 gal.**	**122,887 gal.**	**99,255 gal.**

Annualized Investment Costs for Fresh: $206,464, Annualized Investment Costs for Co-Pack: $13,349, Annual Retail Facility Overhead: $51,600

ESTIMATES

Table 19. Break-Even Sales for Processed Milk

Sales Price Unit Cost	**$3.50/Gallon**	**$4.00/Gallon**	**$4.50/Gallon**	**$5.00/Gallon**
$2.00 Fresh	**107, 277 gal.**	**80,457 gal.**	**64,366 gal.**	**53,638 gal.**

Annualized Investment Costs for Fresh: $117,915, Annualized Investment Costs for Co-Pack: $11,124, Annual Retail Facility Overhead: $43,000

UNDER-ESTIMATES

Table 20. Break-Even Sales for Processed Milk

Sales Price Unit Cost	$3.50/Gallon	$4.00/Gallon	$4.50/Gallon	$5.00/Gallon
$1.60 Fresh	32,976 gal.	26,106 gal.	21,605 gal.	18,427 gal.

Annualized Investment Costs for Fresh: $28,255, Annualized Investment Costs for Co-Pack: $8,899, Annual Retail Facility Overhead: $34,400.

MARKET POTENTIAL & FINANCIAL BREAK-EVEN ANALYSIS COMPARISON

Market & Financial Comparison

Although the cost estimates are "rough estimates" at best, the analysis provides insight to the significant costs, volatile market, and risky proposition at hand. Managerial ability, marketing savvy, and the negotiation of "good deals" have the potential to minimize the risks, costs, and market challenges.

High start-up costs ($250,000 - more than $1 million) require huge sales (18,500 to 176,500 gallons) at premium prices (more than $3.50 per gallon for milk). For example, Mayfield ice cream has an estimated 1.3% of the entire ice cream market and Breyer’s, a national company, has 19.8% of the market.

If the applicant decides to pursue this venture, it is suggested that "specific" production or co-packing plans be made, cost estimates should be obtained, and marketing plans developed. Then a complete financial analysis (3-5 years cash flow and income statement) should be performed.

Conclusion:

There appears to be sufficient market potential for the proposed on-farm milk processing milk products. However, it will be important to package the products according to consumer preferences and have them retailed where shoppers go to purchase milk products, i.e., grocery stores and convenience stores. The project looks to be feasible if the dairy can sell approximately 80,000 gallons of milk at a retail price of around $4.00 per gallon.

The Center for Agribusiness & Economic Development

The Center for Agribusiness and Economic Development is a unit of the College of Agricultural and Environmental Sciences of the University of Georgia, combining the missions of research and extension. The Center has among its objectives:

> To provide feasibility and other short term studies for current or potential Georgia agribusiness firms and/or emerging food and fiber industries.
>
> To provide agricultural, natural resource, and demographic data for private and public decision makers.

To find out more, visit our Web site at: http://www.caed.uga.edu

Or contact:

John McKissick, Director
Center for Agribusiness and Economic Development
Lumpkin House
The University of Georgia
Athens, Georgia 30602-7509
Phone (706)542-0760
caed@agecon.uga.edu

Report Number: FR-05-01 **February 2005**

Issued in furtherance of Cooperation Extension Acts of May 8 and June 30, 1914, the University of Georgia College of Agricultural and Environmental Sciences, and the U.S. Department of Agriculture cooperating.

Gale Buchanan, Dean and Director