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# AFGHANISTAN ALTERNATIVE LIVELIHOOD PROJECT – SOUTHERN REGION

Dairy Production and Processing Feasibility Study

Helmand and Kandahar Provinces

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## Helmand and Kandahar Provinces

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## **Executive Summary**

The following is submitted to the Agribusiness manager for the Alternative Livelihoods Program South (ALP/S) in Afghanistan. This dairy consultant was task with determining the feasibility of dairy production, dairy processing and marketing in Helmand and Kandahar provinces. The goal being to introduce an alternative income source to local farmers other than poppy production. The current state of a viable dairy industry in southern Afghanistan is virtually nonexistent. There is a very small amount of milk being supplied to retail vendors by local farmers. No testing is being done on this milk which raises serious health concerns for consumers. Milk has historically been a staple to Afghan diets, and continues to be desired. The determination of this feasibility analysis concludes that a dairy business can be profitable for local farmers and also for a processing plant. The manageable sized operation being suggested in this study is far from being large enough to supply the demand. Working with the current condition of existing dairy cows and knowledge base of producers requires a relatively small initial startup plant. The suggested plant is small enough to process limited runs initially but of sufficient size to accommodate our tenth year projected volume of eighteen tons per day. This study will show with sufficient preparatory ground work and a well structured monitoring system, a profitable dairy industry can be established. The study addresses these three related areas:

- 1) Market opportunity of dairy products
- 2) Production of the raw milk
- 3) Processing of raw milk into finished products

### ***Markets:***

Dairy products are currently marketed through independent shops, bazaars and serai's located in the cities and villages. There are also 25 "Dairy Association" vendors in Helmand and 38 in Kandahar. Milk is purchased from local farmers who deliver milk to the retail outlets. The milk is normally pasteurized by open flame in the stores then marketed as milk, butter, curds or yogurt. In summer months a buttermilk product called Shlumbi is also sold. Availability of milk is very limited in winter months as milk production on the farms drops dramatically. The drop in production is mainly due to pour animal health and lack of available feed to the dairy cows. Quantity will be addressed in further detail later in the report. In summer months milk supply is greater but does not meet the demand. Consumer confidence in products from these shops is low due to concerns of quality and food safety. I observed no quality testing being done on the raw milk or products produced in Helmand or Kandahar provinces. The possible and likely presence of Brucellosis, Tuberculosis, mastitis, high bacteria and somatic cell counts leave room for legitimate food safety concerns. Although Afghans prefer fresh milk some purchase powdered milk and reconstitute due to milk safety concerns. A small amount of UHT milk is sold through a few outlets. Imported dairy products enter

Afghanistan mainly from Iran and Pakistan, although some UHT and dehydrated product originate in Europe.

As mentioned above the demand for dairy products is not currently being met. The potential market for farm fresh, quality tested dairy products is virtually untapped.

The combined populations of Helmand and Kandahar provinces total 1,716,000. Children attending schools in these provinces total 210,666.

To offer some idea of the current market opportunity for milk and milk products consider the following: If 1/10<sup>th</sup> of the population of these two provinces consumed 1 cup of milk each day this would equate to a 40 ton daily requirement. If students attending school in these same provinces consumed ½ of their recommended daily requirement of milk, 77 ton per day would be required to meet their need. Our projected year 10 processing tonnage is 18 tons per day, a fraction of current opportunity.

Milk production over the next several years will be used more for import substitution and filling the currently unmet demand than for exporting.

Although marginal, current infrastructure could support a startup dairy industry by addressing a few areas. Two areas requiring improvement are power generation and refrigeration.

The following table is a collection of dairy product pricing collected from Lashkar gah, Kandahar and Kabul:

<b>Product</b>	<b>Retail Price Lashkar gah</b>	<b>Retail Price Kandahar</b>	<b>Retail Price Kabul</b>	
Whole milk	.36 liter	.55 liter	.40 - .52 liter	
UHT milk	½ ltr .50	½ ltr .50	1 liter .90 - \$1.00	
Butter	3.67 kg	\$4.40 kg	4.00 kg	
Yogurt	.39 kg	.48 kg	.54 kg 1/2lt..30	
Shlumbi	.11 liter	.19 kg	½ kg .30	
Chakida	\$1.46 kg	\$1.17 kg	\$1.60 kg	
Cream	\$2.80 kg	\$2.95 kg	\$3.25 kg	
Ice cream	500grms .44	n/a	n/a	
Farmers receive	.16 - .20 kg	.16 - .20 kg	.22 -.24 kg	
			.02 to milk collector	

Helmand and Kandahar represent less than 10% of Afghanistan's total population:

(In Million)

<b>Description</b>	<b>1355 (1976-77)</b>	<b>1356 (1977-78)</b>	<b>1357 (1978-79)</b>	<b>1383 (2004-05)</b>
Total Population - Afghanistan	14.377	14.738	15.108	23.3
Male	7.476	7.664	7.856	11.1
Female	6.901	7.074	7.252	10.6
Rural Population	10.991	11.255	11.525	17.0
Urban Population	2.004	2.068	2.134	4.7

*Settled Population	12.995	13.323	13.659	21.7
Nomad Population	1.382	1.415	1.449	1.5

Source: Central Statistical office, Ministry of Planning, GOA, 1978, 2004.

\*Settled Population is the total of rural and urban populations

## MARKETING INFRASTRUCTURE

### Helmand

### Kandahar

Districts	Nature of Market		Districts	Nature of Market	
	Bazaar	Serai		Bazaar	Serai
Arghandab	3	0	Arghistan	2	0
Daman	0	0	Dand	0	0
Ghorak	0	0	Khakrez	2	0
Maiwand	1	0	Maruf	1	1
Nesh	0	0	Panjwai	4	0
Reg	0	0	Shahwalikot	0	0
Shegah	0	0	Shorabak	0	0
Spin Boldak	3	5			

Source: UNIDATA, 1990

A serai, shortened from 'caravan serai', is a marketing-center. Six of these bazaars are large and active bazaars selling commodities like food staples, cloth, plastic products, agricultural inputs and tools and cooking or eating utensils.

### Freight costs from Lashkar Gah to the following cities Rate prepared by a local transportation agency

No	Name of trucks	Costs				Load by Mt	Truck Value
		Kandahar	Kabul	Nimroz	Herat		
1	Mazda truck (small truck)	\$90	\$360	Not going	Not going	5 Mt	\$10,000
2	Hino Truck 6 bolts	\$150	\$500 Afs	\$300	\$300	10 Mt	\$12 - \$14,280
3	Mercedes Truck 10 tires	\$280	\$1000	\$400	\$400	24 - 30 Mt	\$18 - \$20,400
4	Hino 8 bolts trucks	\$200	\$600	\$360	\$360	15 Mt	
5	Trailer 18 Tires	\$560	\$1400	\$1000	\$1000	60- 80 Mt	
6	Refrigerated truck	\$140	\$400	\$300	\$300	2 Mt	\$10,200
7	Boldek Border to Quetta	\$140					
8							
9	Turbo Trucks				\$400		\$30,000
10							
11							

The above freight costs depend on fuel costs and climate. Afghanistan Trucks are not allowed to go inside of Iran; although some fuel tankers can cross the border.

## Raw Milk Production:

Most families units in rural Helmand and Kandahar have from 1 to 5 cows used for milking and calf rearing. Most milk produced by these cows is consumed by the family unit, excess milk not needed for family consumption is traded to neighbors or sold in nearby villages or towns. Milk sales are not currently a major income source. A simple cost benefit analysis of current milk production in Helmand and Kandahar provinces shows why this is the case:

The following “**cost benefit**” example assumes:

- 2 month dry period prior to calving
- daily milk production per cow @ 5 liters per day (current production is @ 2 - 4 liters per day)
- No labor charge
- No cost for equipment
- No repeat breeding charge
- Minimal feed expense
- Minimal veterinary expense
- Milk price of 12 Afs per liter (current price to farmer is 8 - 10 Afs)

One cow (assuming 5 liters per day 305 days @ 12Afs p/ltr.) = 1525 liters @ .24 = annual income per cow: **\$366.00**

Feed cost per cow annually:

	Grain @ 1 lbs. per day	\$21.90	
	Hay equivalent 4,255kg	\$292.00	
	Vitamin/mineral mix	<u>\$18.25</u>	
	<b>Total Feed cost =</b>		<b>\$332.15</b>
Annual misc. add ins:	breeding fees:	\$3.06	
	bedding	\$14.60	
	sanitation prod.	\$8.00	
	vet/med.s	<u>\$22.00</u>	
	<b>Total misc.</b>		<b><u>\$47.66</u></b>
<b>Total feed &amp; misc. cost</b>			<b>\$379.81</b>

**Total annual income per head: = \$366.00**

**Total out of pocket costs p/head -\$379.81**

**Net Income = -\$13.81**

One can easily see why dairy production under these circumstances is not a viable enterprise. The obvious question is how can dairy production ever be a profitable business in Helmand and Kandahar? A few adjustments to the current scenario can shed light on this.

During the 1950's and 1970's European genetics were introduced to these provinces. Remnants of Holstein, Jersey and Brown Swiss genetics are still expressed in dairy animals I viewed on farms around Lashkar gah.

In the United States and the Middle East under normal conditions with adequate feed, sanitary environments, healthy and genetically improved animals, milk production is expected to be from 32 to 42 liters per day.

Now assume 32 liters per day @ .24 p/ltr. = \$7.68 per day or **\$2,342.00** for 305 days

This obviously changes the picture. Add 20% to value of the milk and it looks even better. An increase in production from 4 or 5 liters per day to 32 will take a few years to accomplish. As can be seen from the cost benefit example above a minimal increase in production can put the enterprise in the black.

Realizing the importance of good quality fresh milk in human diets, especially in children, leaves incentive to address two relevant issues. One issue is the current lack of quality milk and milk products, the second being an Alternative Livelihood for local farmers.

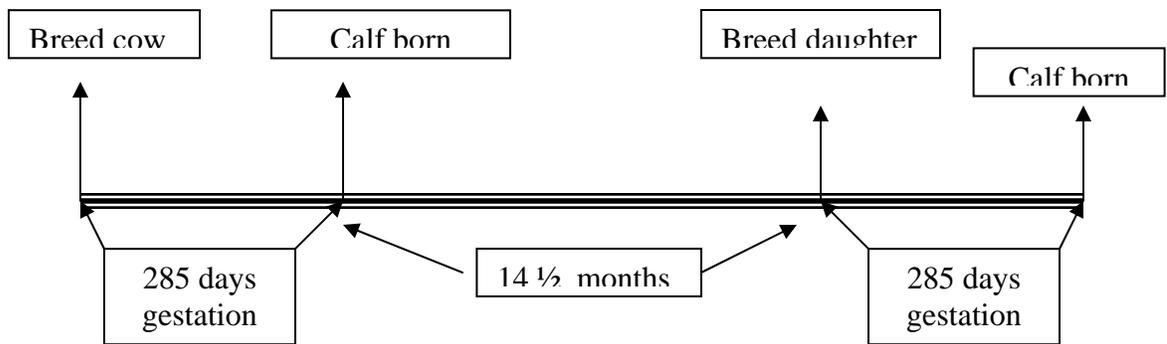
### ***Dairy Farmer Recommendations:***

The following areas need attention prior to milk collection for retail distribution:

- Extension network involving women to train milk producers
- Health testing and treatment of current dairy animals
- Genetic mating using artificial insemination for the current animals
- Training of the milkers in sanitation and hygiene
- Ration balancing for differing feed stuffs throughout the year.
- System to address winter feed availability
- Milk receptacle cleaning and sanitation
- Association of milk producers organized

The production potential of existing dairy animals is limited due to typical malnutrition and overall animal health. This has contributed to the current animal size (340kg – 410kg), which is normally smaller than what is desired in typical dairy animals (500kg – 637kg). Therefore even after animals are restored to adequate rations and good health, their production potential is still limited. Genetic mating of sires to the existing cows will give immediate improvement to the production potential of subsequent progeny. Daughters from genetically mated sires could easily produce three times the current production of their mothers. Despite the low returns from the existing cattle their value remains high from \$714 to \$1400.

The time required before these daughters are producing milk will be at least 2 years and 9 months. The time line below delineates the time from breeding the mother until the daughter has her first calf and enters the milking herd.



Remember, the chance of having female offspring is 50 / 50.

I do not recommend initiating a commercial size and style dairy operation at this time for the above reasons. I do recommend after initiating the above mentioned recommendations and establishing a more productive herd a commercial operation be reviewed again. This would probably be in 4 to 5 years.

## Milk Processing

At this time modern technology for milk processing is not being used in the country of Afghanistan. The FAO dairy currently Guzergah Dairy in Kabul is planning to modernize their plant, but currently an open flame pasteurization process is being used and butter is being made in clothes washing machines. I visited a milk collection and “processing” operation in Parwan province. This operation will have three collection points, one has started testing, pasteurizing, and cooling milk. Currently milk is sold in nearby bazaars. No collection is done in the winter months due to lack of production.

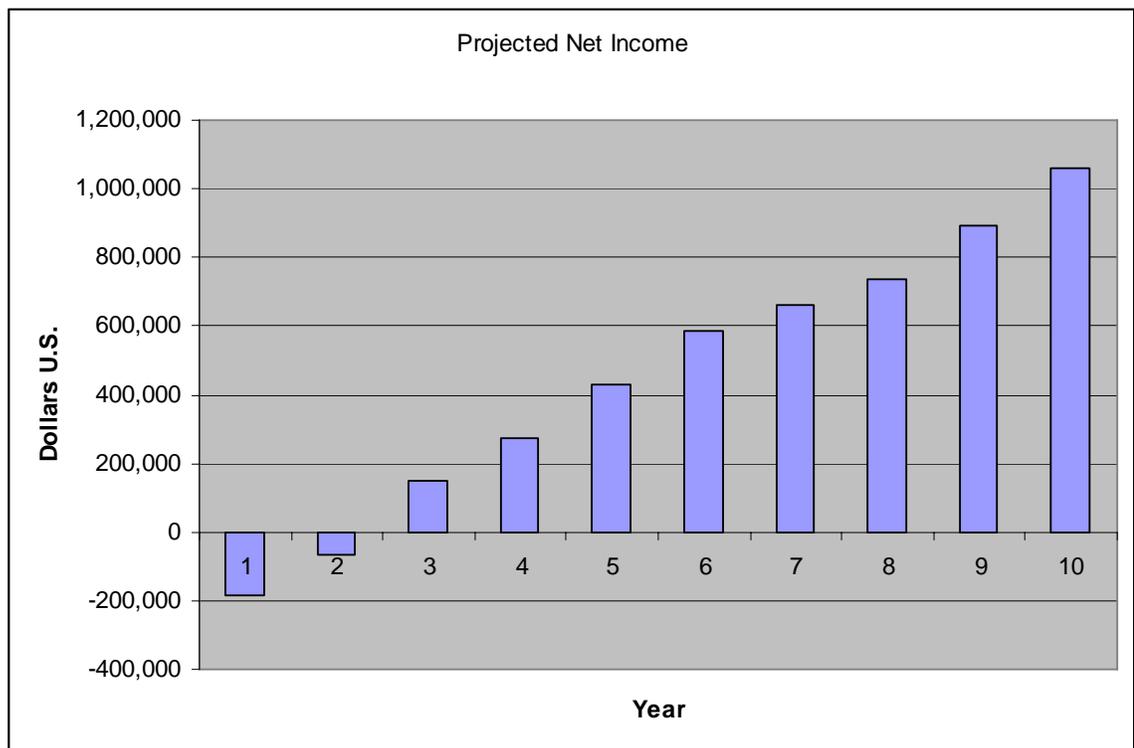
A processing plant small enough to economically justify processing small initial quantities of milk but of adequate size to accommodate expansion makes financial sense. Prior to a processing plant coming online the above mentioned “Dairy Farmer Recommendations” will be implemented and ongoing. Establishing quality standards and facilitating year round production of raw milk will be initial goals which will encourage producers’ relationships with those providing technical assistance and the processing plant ownership.

The basic structure I recommend for the processing plant includes the following;

- Processing capacity of 5000 liters per 5 hour shift
- 2 collection points in outlying areas (possibly Nade ali and Marja) The processing plant will serve as the third collection point. Each point will be equipped to receive, test and cool milk from area farmers.
- 2, three-wheeled motorcycles to transport milk from farms to each respective collection center
- One truck equipped with a bulk tank for milk transport from collection points to the plant
- Two finished product refrigerated delivery trucks

## Processing Plant

The recommended processing plant will have 5000 liter per 5 hour shift capacity. This size plant is small enough to be affordable and handle low initial volume, but have capacity for adding shifts to accommodate increasing production. This size plant's capacity is larger than needed for the first 3 - 4 years of operation. Therefore, for the first 3 - 4 years, we're asking a limited volume of milk to pay for a larger than currently justifiable plant in order to eventually expand. In years one and two labor is more than sufficient but necessary to have an experienced work force in place as production increases. As would be expected the first 2 years of operation show a loss on the income statement. The following chart reflects this.



Before exploring in depth financial analysis allow me to lay some ground work as to some physical characteristics of the proposed operation.

## Products and Vendors

The finished packaged products will be milk, butter, yogurt & ice cream, with possibly Chakka, Shlumbi curds and others being added as the market dictates. These will be delivered to participating vendors at wholesale prices. Criteria must be met for vendors to qualify to market these products. Assistance with compliance to these criteria will be offered to prospective vendors in the areas of product quality, display, refrigeration, sanitation and retail pricing by plant personnel or other qualified individuals.

## Milk collection for delivery to the processing plant

A dairy farmer will be allowed to sell his milk to the plant only after he has completed the steps necessary to obtain permission. Extension agents will assist farmers with this compliance process. I suggest an association of dairy farmers be initiated also to bring cohesiveness and a collective voice for information flow.

### Initial Investment

For equipment purchases, structures and vehicles, a \$712,750 initial investment is required. An additional \$165,000 operating loan for startup capital is also needed. In year six after the first vehicles are depreciated, replacements are purchased, totaling \$88,600. The initial \$712,750 investment is amortized over a 10 year payback as reflected in “Debt Service” on the income statement. The \$165,000 operating loan is amortized over a 5 year payback. This is also shown on the income statement. The \$88,600 vehicle replacement charge is amortized over 5 years starting in year 6. An generalized equipment listing and depreciation schedules are in the following chart.

EQUIPMENT LIST				Depreciation Schedule			
				5 years	10 years	20 years	30 years
Processing Plant Equipment			430,000			430,000	
Building - plant - refrig. storage			120,000				120,000
Bulk receiving / CIP / Flow Meters			6,000		6,000		
Laboratory Equipment (satellite included)			5,800		5,800		
Office Equipment			5,000		5,000		
Ancillary Supplies			3,000		3,000		
Satellite points p/u x 2							
bulk tank/compressor	16000						
desk - files	325						
refrigerator	450						
scales (gross/net printer)	600						
generator	3500						
water heater - can washer	2500						
farm to satelite containers	1300						
building	2500						
3-wheel motorcycle truck	6800						
Total Satellite	33975	x 2 =	67950		67950		
Bulk Milk pick-up truck			35000	35000			
2 - Delivery trucks			40000	40000			
			75000	<b>Total</b>	<b>75,000</b>	<b>87,750</b>	<b>0</b>
					<b>430,000</b>	<b>120,000</b>	<b>\$712,750</b>
<b>Purchase additional or replacement trucks in year 6</b>							
Bulk Milk pick-up truck			35000				
2 - Delivery trucks			40000				
2 - 3-wheel motorcycle truck			<u>13600</u>				
		<b>Total</b>	<b>88600</b>				

**DEPRECIATION SCHEDULE**

Description	Total	Life	Monthly Depreciation	Annual Depreciation
Dairy Processing Plant	\$430,000	20	\$1,792	\$21,500
Building - plant - refrig. storage	\$120,000	30	\$333	\$4,000
Plant Ancillary Equipment	\$19,800	10	\$165	\$1,980
Satellite Equipment	\$67,950	10	\$566	\$6,795
Vehicles	\$75,000	5	\$1,250	\$15,000
<b>TOTAL</b>	<b>\$712,750</b>		<b>\$4,106</b>	<b>\$49,275</b>

**Year 6 vehicle additions and/or replacements**

Description	Total	Life	Monthly Deprecia	Annual Depreciation
Bulk Milk pick-up truck	\$35,000	5	\$583	\$7,000
2 - Delivery trucks	\$40,000	5	\$667	\$8,000
2, 3-wheel motorcycles	\$13,600	5	\$227	\$2,720
<b>TOTAL</b>	<b>\$88,600</b>		<b>\$1,477</b>	<b>\$17,720</b>

**MILK PICK-UP COSTS**

Description	Daily	Monthly	Annual
Kilometers Driven (4 x per week)*	200	3200	38400
Fuel Costs (.80 per liter)	22	353	4237
Kilometers per Liter	7.25	7.25	7.25
<b>Total Fuel Costs</b>	<b>22</b>	<b>353</b>	<b>4237</b>
Repair & Maintenance Costs	0.67	20.1	241.2
Number of trucks Operating	1	1	1
<b>Aggregate Costs:</b>	<b>\$23</b>	<b>\$373</b>	<b>\$4,478</b>

\*4 - 200km trips per wk 4 per month

**PRODUCT DELIVERY COSTS**

Description	Daily	Monthly	Annual
Kilometers Driven	300	6000	72000
Fuel Costs (.80 per liter)	20	403	4840
Kilometers per Liter	11.9	11.9	11.9
<b>Total Fuel Costs</b>	<b>20</b>	<b>403</b>	<b>4840</b>
Repair & Maintenance Costs	0.72	14.4	172.8
Number of trucks Operating	2	2	2
<b>Aggregate Costs:</b>	<b>\$42</b>	<b>\$836</b>	<b>\$10,026</b>

**LABOR COSTS**

Description	Number	Monthly Salary / Individual	Total Monthly Salaries	Total Annual Salary
<b>MANAGEMENT &amp; ADMINISTRATIVE</b>				
Production Manager	1	480	480	5760
Office Manager	1	350	350	4200
Sales Manager	1	350	350	4200
<b>Total</b>	<b>3</b>	<b>\$1,180</b>	<b>\$1,180</b>	<b>\$14,160</b>
<b>DIRECT LABOR</b>				
Foreman	1	360	360	4320
Milk processing & packaging	3	100	300	3600
Cooler, case room, loading	1	80	80	960
Driver (milk pick up)	1	120	120	1440
Drivers (delivery)	2	160	320	3840
Maintenance	1	80	80	960
Security	10	80	800	9600
Fieldman: (farms)	1	80	80	960
<b>TOTAL</b>	<b>20</b>	<b>\$1,060</b>	<b>\$2,140</b>	<b>\$25,680</b>
<b>GRAND TOTAL:</b>	<b>23</b>	<b>\$2,240</b>	<b>\$3,320</b>	<b>\$39,840</b>

The charts above are based on year 3 production level of 6.2 Ton per day. Initial startup and subsequent year's requirements will dictate the actual number of necessary milk deliveries to the plant and also the actual number of employees necessary for economic and logistical proficiency. Milk pickup from dairy farms in the states is commonly 3 or 4 times per week. This will not be practical in Helmand

or Kandahar as no refrigeration on the farms are planned for at this point. Each collection point will be equipped with a refrigerated bulk milk storage tank with capacity for multiple days' storage. This will give flexibility in scheduling milk deliveries to the plant from collection centers.

The following table gives an example of a product mix and related expected Cost of Goods Sold. Various product mixes may be entered into the table but products are limited by the milk or milk fat required to make the product. Such as: whole milk is considered to have a minimum of 3.25 % milk fat. For example; if raw milk purchased from farmers has a milk fat percentage of 4% milk fat, we have .75% fat to use in production of other products. Product preference, seasonal demand and profitability help determine which products will be produced.

### COST OF GOODS SOLD (COGS) CALCULATION

Year 1									
<b>TONS MILK Produced Daily</b>		<b>6.2</b>							
<b>RAW MILK PURCHASED:</b>	<b>100%</b>	<b>6.2</b>							
<b>ANNUAL LITERS PURCHASED:</b>		<b>2193216</b>							
					PER UNIT PRICING				
PRODUCT DESCRIPTION	PRODUCTION PERCENTAGE	LITERS OF RAW MILK	FINISHED PRODUCTION (METRIC)	UNIT OF MEASURE	CONVERSION FACTOR (Milk / Product)	Dairy Cost	Flavor and Misc.	Packaging Cost	Total COGS
Fluid Milk	45%	986,947	986,947	Liters	1:1	0.31	0.00	0.12	0.43
Fluid Milk	5%	109,661	438,643	1/4 Liters	1:4	0.08	0.00	0.04	0.12
Ice cream, vanilla	10%	219,322	157,254	Liters	4.5:12	0.39	0.28	0.20	0.87
Ice cream, flavored	5%	109,661	78,627	Liters	4.5:12	0.39	0.46	0.20	1.05
Ice cream, flavored	5%	109,661	628,356	125 Milliliters	4.5:12	0.05	0.07	0.07	0.19
Shlumbi	10%	219,322	491,280	1/2 Liter	1:2.5	0.05	0.02	0.07	0.14
Butter	10%	219,322	21,318	500 grams	1:21.2	1.04	0.00	0.06	1.10
Yogurt, unflavored	5%	109,661	376,685	250 grams	1:1.2	0.09	0.03	0.09	0.21
Yogurt, flavored	5%	109,661	376,685	250 grams	1:1.2	0.09	0.09	0.09	0.27
Sour cream	0%		0	250 grams	1:5	0.16	0.00	0.09	0.25
Half & Half	0%		0	1/2 Liter	1:2.5	0.23	0.00	0.07	0.30
Heavy cream	0%		0	1/2 Liter	1:10	0.46	0.00	0.07	0.53
<b>TOTALS:</b>	<b>100.0%</b>	<b>2,193,216</b>							

\* Raw milk constitutes the major portion of total cost of goods sold

\* Raw milk cost is based on a purchase price per lite of: \$0.31

Packaging costs will vary depending on: type, colors, size and freight costs.

The cost of goods sold figure arrived at on the chart above is used in the following chart. This chart allows manipulation of suggested retail price and product price charged to vendors (margin). The table then shows the resulting per unit margin percentage for retail and wholesale, then the total margin income retail and wholesale and the resulting total sales dollars retail and wholesale. The overall aggregated product mix gross margin is displayed at the bottom of the table.

Sales Mix and Production Projection													
Year 1													
RAW MILK PRODUCED, DAILY METRIC TONS:		6.2											
RAW MILK PURCHASED:	100%	6.2											
ANNUAL LITERS PRODUCED:		2,193,216		Retail less % Wholesale	20								
PRODUCT DESCRIPTION	PRODUCTION PERCENTAGE	LITERS OF RAW MILK	FINISHED PRODUCTION (METRIC)	UNIT OF MEASURE	COST OF GOODS SOLD*	PER UNIT PRICING				TOTAL SALES (RETAIL)	TOTAL MARGIN DOLLARS (RETAIL)	TOTAL SALES (WHOLE SALE)	TOTAL MARGIN DOLLARS (WHOLE SALE)
						RETAIL 100%	RETAIL LESS 20% (WHOLE - SALE)	GROSS MARGIN (RETAIL)	GROSS MARGIN (WHOLE SALE)				
Fluid Milk	45%	986,947	986,947	Liter	0.43	0.58	0.46	25.9%	7.3%	572,429	148,042	457,943	33,556
Fluid Milk	5%	109,661	438,643	1/4 Liter	0.12	0.22	0.18	46.6%	33.2%	96,501	44,961	77,201	25,661
Ice cream, vanilla	10%	219,322	157,254	Liters	0.87	1.40	1.12	37.6%	22.0%	220,155	82,763	176,124	38,732
Ice cream, flavored	5%	109,661	78,627	Liters	1.05	1.75	1.40	39.8%	24.7%	137,597	54,748	110,078	27,228
Ice cream, flavored	5%	109,661	628,356	125 Milliliters	0.19	0.35	0.28	44.9%	31.2%	219,925	98,840	175,940	54,856
Shlumbi	10%	219,322	491,280	1/2 Liter	0.14	0.35	0.28	60.0%	50.0%	171,948	103,169	137,558	68,779
Butter	10%	219,322	21,318	500 grams	1.10	1.80	1.44	38.6%	23.3%	38,373	14,823	30,698	7,148
Yogurt, unflavored	5%	109,661	376,685	250 grams	0.21	0.65	0.52	67.2%	59.0%	244,845	164,611	195,876	115,642
Yogurt, flavored	5%	109,661	376,685	250 grams	0.27	0.75	0.60	63.6%	54.5%	282,514	179,679	226,011	123,176
Sour cream	0%		0	250 grams	0.25	0.68	0.54	64.0%	55.0%	0	0	0	0
Half & Half	0%		0	1/2 Liter	0.30	0.90	0.72	67.1%	58.8%	0	0	0	0
Heavy cream	0%		0	1/2 Liter	0.53	1.30	1.04	59.6%	49.5%	0	0	0	0
<b>TOTALS:</b>	<b>100.0%</b>	2,193,216						44.9%	31.2%	1,984,287	891,635	1,587,430	494,778

\* Raw milk constitutes the major portion of total cost of goods sold

\* Raw milk cost is based on a purchase price per liter

As the previous bar chart indicated the plant shows a loss for the first two years of operation. Year 1 (-\$185,784) Year 2 (-\$66,583) subsequent years show a continuous profitable increase to a healthy \$1,057,468 in year 10. This model shows no investment capital other than borrowed funds. Initial debt is serviced aggressively in a 10 year amortization. Considering the capacity for expansion the plant offers, the startup loss is modest to overcome. Year 1 projections have production at 1.5 Metric Tons per day steadily increasing to 18 Metric Ton in year 10. The Income statement is the following chart which reflects this more specifically.

## INCOME STATEMENT

	Projections	Year 1	Year 2	Year 3	Year 4	Year5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>INPUT TONAGE</b>	<b>6.2</b>	<b>1.5</b>	<b>3.2</b>	<b>6.2</b>	<b>8</b>	<b>10</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>16</b>	<b>18</b>
<b>GROSS MARGIN</b>	31.2%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%
<b>LOCAL SALES -</b>	1,587,430	384,056	819,319	1,587,430	2,048,296	2,560,370	3,072,444	3,328,482	3,584,519	4,096,593	4,608,667
<b>EXPORT SALES -</b>											
<b>TOTAL SALES REVENUE</b>	1,587,430	384,056	819,319	1,587,430	2,048,296	2,560,370	3,072,444	3,328,482	3,584,519	4,096,593	4,608,667
<b>COST OF GOODS SOLD</b>	1,092,652	265,257	565,882	1,096,396	1,414,704	1,768,380	2,122,056	2,298,894	2,475,732	2,829,408	3,183,084
<b>GROSS MARGIN</b>	<b>494,778</b>	<b>118,799</b>	<b>253,437</b>	<b>491,034</b>	<b>633,592</b>	<b>791,990</b>	<b>950,388</b>	<b>1,029,587</b>	<b>1,108,786</b>	<b>1,267,184</b>	<b>1,425,582</b>
<b>EXPENSES:</b>											
<b>Variable Costs:</b>											
Production bonus	0	0	0	0	0	0	0	0	0	0	0
Import fees and VAT (packaging)	0	0	0	0	0	0	0	0	0	0	0
Export duty	0	0	0	0	0	0	0	0	0	0	0
Sales and marketing	5,000	4,000	5,000	5,000	5,000	8,000	8,000	9,000	9,000	10,000	10,000
Milk Pick-up	4,478	3,255	4,478	4,478	5,200	5,300	5,300	6,000	6,000	6,500	6,500
Product Delivery	10,026	6,475	10,026	10,026	11,027	12,025	13,125	14,230	14,820	15,210	15,335
Advertising	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
Maintenance	3,120	1,525	3,120	3,120	3,875	3,925	3,925	4,120	4,350	4,475	4,805
Utilities	55,000	11,522	24,579	47,623	57,240	58,135	58,385	58,620	59,055	60,210	67,500
Direct Labor	25,680	25,680	25,680	25,680	26,950	27,010	27,010	28,000	28,850	29,010	29,850
<b>Total Variable Costs</b>	<b>111,305</b>	<b>60,457</b>	<b>80,884</b>	<b>103,928</b>	<b>117,292</b>	<b>122,395</b>	<b>123,745</b>	<b>127,970</b>	<b>129,875</b>	<b>133,405</b>	<b>141,990</b>
<b>Margin</b>	<b>383,473</b>	<b>58,342</b>	<b>172,553</b>	<b>387,106</b>	<b>516,300</b>	<b>669,595</b>	<b>826,643</b>	<b>901,617</b>	<b>978,911</b>	<b>1,133,779</b>	<b>1,283,592</b>
<b>General &amp; Admin Exp.:</b>											
Labor costs	14160	14160	14160	14160	16,230	17685	17890	18005	18280	18620	18885
Office Supplies	240	240	240	240	380	405	455	485	505	525	590
Insurance, Lic & Permits	0	0	0	0	0	0	0	0	0	0	0
Phone, Fax & Postage	360	180	360	360	424	450	465	490	515	575	602
Other expenses											
<b>TOTAL General &amp; Admin</b>	<b>14,760</b>	<b>14,580</b>	<b>14,760</b>	<b>14,760</b>	<b>17,034</b>	<b>18,540</b>	<b>18,810</b>	<b>18,980</b>	<b>19,300</b>	<b>19,720</b>	<b>20,077</b>
<b>TOTAL EXPENSES</b>	<b>126,065</b>	<b>75,037</b>	<b>95,644</b>	<b>118,688</b>	<b>134,326</b>	<b>140,935</b>	<b>142,555</b>	<b>146,950</b>	<b>149,175</b>	<b>153,125</b>	<b>162,067</b>
<b>OPERATING INCOME</b>	<b>368,713</b>	<b>43,762</b>	<b>157,793</b>	<b>372,346</b>	<b>499,266</b>	<b>651,055</b>	<b>807,833</b>	<b>882,637</b>	<b>959,611</b>	<b>1,114,059</b>	<b>1,263,515</b>
<b>OTHER INCOME (EXPENSES)</b>											
Equipment Depreciation	49,275	49,275	49,275	49,275	49,275	49,275	66,954	66,954	66,954	66,954	66,954
Int. exp. Op loan & (Added trucks)	(23,100)	19,800	16,883	13,193	9,283	9,283	(10,632)	(8,958)	(7,084)	(4,985)	(2,633)
Interest expense (12%)	(85,530)	(93,930)	(83,893)	(78,215)	(71,856)	(64,773)	(56,757)	(47,823)	(37,817)	(26,610)	(14,058)
<b>Total Other</b>	<b>(157,905)</b>	<b>(163,005)</b>	<b>(149,851)</b>	<b>(140,683)</b>	<b>(130,414)</b>	<b>(123,331)</b>	<b>(134,343)</b>	<b>(123,735)</b>	<b>(111,855)</b>	<b>(98,549)</b>	<b>(83,645)</b>
<b>PRE-TAX INCOME</b>	<b>210,808</b>	<b>-119,243</b>	<b>7,942</b>	<b>231,664</b>	<b>368,852</b>	<b>527,724</b>	<b>673,490</b>	<b>758,902</b>	<b>847,756</b>	<b>1,015,510</b>	<b>1,179,870</b>
Profits Tax ( %)											
<b>NET INCOME after taxes</b>	<b>210,808</b>	<b>-119,243</b>	<b>7,942</b>	<b>231,664</b>	<b>368,852</b>	<b>527,724</b>	<b>673,490</b>	<b>758,902</b>	<b>847,756</b>	<b>1,015,510</b>	<b>1,179,870</b>
Debt Service Operating loan (prin)		25,973	29,089	32,580	36,490	35,964	16,818	18,786	21,096	23,628	24,288
Debt Service (principle)	(42,245)	(40,568)	(45,436)	(50,889)	(56,995)	(63,835)	(71,578)	(80,168)	(89,788)	(100,562)	(98,114)
<b>NET INCOME after debt service</b>	<b>168,563</b>	<b>-185,784</b>	<b>-66,583</b>	<b>148,195</b>	<b>275,368</b>	<b>427,925</b>	<b>585,094</b>	<b>659,948</b>	<b>736,872</b>	<b>891,320</b>	<b>1,057,468</b>
Initial Inv.											
	<b>\$712,750</b>										
present value of future inc.		-\$165,887	-\$52,781	\$105,485	\$174,996	\$242,805	\$296,409	\$298,495	\$297,623	\$321,410	\$340,505
projected PV of I (table 3)	\$1,859,060										
total 10 yr net income	4,529,824										
average annual income	452,982										
factor @ annuity table	1.57										
resulting IRR	> 32%										

## **Variables Affecting Profitability**

Two main variables affect profitability. One is if some event(s) causes there to be a shortage of milk produced on the supplying farms, resulting in a related drop in product production and related sales; how far can production fall and still allow us to break-even?

The second variable is if some event occurs in the market that does not allow us to sell products at our desired prices; how much can we reduce our margins and still break-even?

In the following two sensitivity analysis' "Break-Even" is derived from 2 approaches. The first is based on the volume of processed milk required to satisfy variable and fixed costs. (Under this scenario milk price and profit margins are held static.)

The second approach is based on product price. To what level can margin or product price drop and still satisfy fixed and variable costs? (This scenario maintains a constant volume of milk production)

## **Sales Sensitivity**

In this analysis production can drop to 3.5 Tons of raw milk per day and we still "Break-Even". The tonnage used as a benchmark (Realistic) amount in these charts is a moderate level of production on which deviations are based, is 6.2 Tons per day. The column on the right and left sides of "Realistic" shows results from a 20% increase and decrease in production.

**PROFORMA INCOME STATEMENT**

<b>ASSUMPTIONS: Decreases in raw milk input and related drop in sales</b>				
<b>SALES SENSITIVITY</b>	<b>(43% drop) Break-Even</b>	<b>(20% drop)</b>	<b>Realistic</b>	<b>(20% rise)</b>
<b>INPUT TONNAGE</b>	<b>3.5</b>	<b>4.96</b>	<b>6.2</b>	<b>7.44</b>
<b>GROSS MARGIN PERCENTAGE</b>	30.9%	30.9%	31.2%	30.9%
<b>LOCAL SALES</b>	896,130	1,378,406	1,587,430	2,067,609
<b>EXPORT SALES</b>				
<b>TOTAL SALES REVENUE</b>	<b>896,130</b>	<b>1,378,406</b>	<b>1,587,430</b>	<b>2,067,609</b>
<b>COST OF GOODS SOLD</b>	<b>618,933</b>	<b>928,680</b>	<b>1,092,652</b>	<b>1,393,019</b>
<b>GROSS MARGIN</b>	<b>277,197</b>	<b>449,726</b>	<b>494,778</b>	<b>674,590</b>
<b>Expenses</b>				
<b>Variable Costs:</b>				
Production bonus	0	0	0	0
Import fees and VAT (packaging)	0	0	0	0
Export duty	0	0	0	0
Sales and marketing	5,000	5,000	5,000	5,000
Milk Pick-up	3,260	4,478	4,478	5,200
Product Delivery	8,232	10,026	10,026	11,027
Advertising	8,000	8,000	8,000	8,000
Maintenance	2,750	3,120	3,120	3,875
Utilities	41,855	55,000	55,000	57,240
Direct Labor	14,400	16,800	25,680	26,950
<b>Total Variable Costs</b>	<b>83,497</b>	<b>102,425</b>	<b>111,305</b>	<b>117,292</b>
<b>Margin</b>	<b>193,700</b>	<b>347,301</b>	<b>383,473</b>	<b>557,298</b>
<b>General &amp; Admin Exp.:</b>				
Labor costs	3600	3,600	14160	16,230
Office Supplies	240	240	240	380
Insurance, Lisc & Permits	0	0	0	0
Phone, Fax & Postage	342	360	360	424
Depreciation	49,234	49,234	49,275	49,234
Other expenses				
<b>TOTAL General &amp; Admin</b>	<b>53,416</b>	<b>56,975</b>	<b>64,035</b>	<b>66,268</b>
<b>TOTAL EXPENSES</b>	<b>136,913</b>	<b>159,400</b>	<b>175,340</b>	<b>183,560</b>
<b>OPERATING INCOME</b>	<b>140284</b>	<b>290,326</b>	<b>319438</b>	<b>491030</b>
<b>OTHER INCOME (EXPENSES)</b>				
Equipment lease income				
Interest expense (14%)	()	()	(23,100)	()
Interest expense (12%)	(93,930)	(93,930)	(85,530)	(93,930)
<b>Total Other</b>	<b>(93,930)</b>	<b>(93,930)</b>	<b>(108,630)</b>	<b>(93,930)</b>
<b>PRE-TAX INCOME</b>	<b>46,354</b>	<b>196,396</b>	<b>210,808</b>	<b>397,100</b>
Profits Tax ( %)				
<b>NET INCOME after taxes</b>	<b>46,354</b>	<b>197,996</b>	<b>210,808</b>	<b>397,100</b>
Debt Service	(45,436)	(50,889)	(50,889)	(56,995)
<b>NET INCOME after debt service</b>	<b>918</b>	<b>147,107</b>	<b>159,919</b>	<b>340,105</b>

## Margin Sensitivity

The following table shows the second scenario in which margins decrease to the Break-Even point. In this case an 8.6% drop in gross margin takes us to Break-Even at 22.3% gross margin.

<b>DAIRY ENTITIY</b>				
<b>BREAK-EVEN AND SENSIITIVITY ANALYSIS</b>				
<b>INCOME STATEMENT</b>				
<b>ASSUMPTIONS: Decrease in gross margin percentage, expenses held static</b>				
<b>GROSS MARGIN SENSITIVITY</b>	<b>(8.6% drop) Break-Even</b>	<b>(8.4% drop) Worst</b>	<b>Realistic</b>	<b>(10% rise) Best</b>
<b>INPUT TONAGE</b>	<b>6.2</b>	<b>6.2</b>	<b>6.2</b>	<b>6.2</b>
<b>GROSS MARGIN PERCENTAGE</b>	<b>22.3%</b>	<b>22.5%</b>	<b>31.2%</b>	<b>41.4%</b>
			<b>0</b>	
<b>LOCAL SALES -</b>	<b>1,411,423</b>	<b>1,498,261</b>	<b>1,587,430</b>	<b>1,982,315</b>
<b>EXPORT SALES -</b>			<b>0</b>	
<b>TOTAL SALES REVENUE</b>	<b>1,411,423</b>	<b>1,498,261</b>	<b>1,587,430</b>	<b>1,982,315</b>
<b>COST OF GOODS SOLD</b>	<b>1,096,396</b>	<b>1,160,849</b>	<b>1,092,652</b>	<b>1,160,849</b>
<b>GROSS MARGIN</b>	<b>315,027</b>	<b>337,412</b>	<b>494,778</b>	<b>821,466</b>
<b>EXPENSES:</b>				
<b>Variable Costs:</b>				
Production bonus	0	0	0	0
Import fees and VAT (packaging)	0	0	0	0
Export duty	0	0	0	0
Sales and marketing	5,000	5,000	5,000	5,000
Milk Pick-up	4,478	4,478	4,478	4,478
Product Delivery	10,026	10,026	10,026	10,026
Advertising	8,000	8,000	8,000	8,000
Maintenance	3,120	3,120	3,120	3,120
Utilities	55,000	55,000	55,000	55,000
Direct Labor	25,680	25,680	25,680	25,680
<b>Total Variable Costs</b>	<b>111,304</b>	<b>111,304</b>	<b>111,305</b>	<b>111,304</b>
<b>Margin</b>	<b>203,723</b>	<b>226,108</b>	<b>383,473</b>	<b>710,162</b>
<b>General &amp; Admin Exp.:</b>				
Labor costs	14160	14160	14160	14160
Office Supplies	240	240	240	240
Insurance, Lisc & Permits	0	0	0	0
Phone, Fax & Postage	360	360	360	360
Depreciation	49,275	49,275	49,275	49,275
Other expenses				
<b>TOTAL General &amp; Admin</b>	<b>64,035</b>	<b>64,035</b>	<b>64,035</b>	<b>64,035</b>
<b>TOTAL EXPENSES</b>	<b>175,339</b>	<b>175,339</b>	<b>175,340</b>	<b>175,339</b>
<b>OPERATING INCOME</b>	<b>139688</b>	<b>162073</b>	<b>319438</b>	<b>646127</b>
<b>OTHER INCOME (EXPENSES)</b>				
Equipment lease income				
Interest expense (14%)			(23,100)	
Interest expense (12%)	(85,530)	(85,530)	(85,530)	(85,530)
<b>Total Other</b>	<b>(85,530)</b>	<b>(85,530)</b>	<b>(108,630)</b>	<b>(85,530)</b>
<b>PRE-TAX INCOME</b>	<b>54,158</b>	<b>76,543</b>	<b>210,808</b>	<b>560,597</b>
Profits Tax ( %)				
<b>NET INCOME after taxes</b>	<b>54,158</b>	<b>76,543</b>	<b>210,808</b>	<b>560,597</b>
Debt Service	(50,889)	(50,889)	(50,889)	(50,889)
<b>NET INCOME after debt service</b>	<b>3,269</b>	<b>25,654</b>	<b>159,919</b>	<b>509,708</b>

The following assumptions have been made in structuring the balance sheet:

- Accounts Receivable balance equals one month of annual sales
- Finished goods inventory equals one week of annual sales
- Raw milk inventory equals 3 days of purchases
- Supplies inventory includes packaging materials, product additives and cleaning supplies. A constant two month inventory is maintained.

### Proforma Balance Sheets

	Year 1	Year 2	Year 3	Year 4	Year5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>Assets</b>										
<b>Cash</b>	28,491	11,182	208,652	533,295	1,010,495	1,590,761	2,336,449	3,161,372	4,143,274	5,291,985
Accounts receivable	32,005	68,277	132,286	170,691	213,364	256,037	277,373	298,710	341,383	384,056
Finished goods inventory	8,001	17,069	33,071	42,673	53,341	64,009	69,343	74,677	85,346	96,014
Raw milk	4,361	9,304	18,026	23,260	29,075	34,890	37,797	40,705	46,520	52,335
Supplies	22,803	47,136	91,326	117,840	147,300	176,760	191,490	206,220	235,680	265,140
<b>Currnet assets</b>	<b>95,661</b>	<b>152,968</b>	<b>483,362</b>	<b>887,759</b>	<b>1,453,575</b>	<b>2,122,457</b>	<b>2,912,454</b>	<b>3,781,684</b>	<b>4,852,202</b>	<b>6,089,529</b>
Ground lease										
Property & Equipment	712,750	712,750	712,750	712,750	712,750	801,350	801,350	801,350	801,350	801,350
Delivery equipment										
Storage equipment										
Accumulated Depreciation	(49,275)	(98550)	(147825)	(197100)	(246375)	(313329)	(380283)	(447237)	(514191)	(581145)
<b>Fixed Assets</b>	<b>663,475</b>	<b>614,200</b>	<b>564,925</b>	<b>515,650</b>	<b>466,375</b>	<b>488,021</b>	<b>421,067</b>	<b>354,113</b>	<b>287,159</b>	<b>220,205</b>
<b>Contingency reserve</b>	<b>120,000</b>	<b>45,000</b>								
<b>Total Other assets</b>	<b>120,000</b>	<b>45,000</b>	<b>0</b>							
<b>TOTAL ASSETS</b>	<b>879,136</b>	<b>812,168</b>	<b>1,048,287</b>	<b>1,403,409</b>	<b>1,919,950</b>	<b>2,610,478</b>	<b>3,333,521</b>	<b>4,135,797</b>	<b>5,139,361</b>	<b>6,309,734</b>
<b>LIABILITIES</b>										
Accounts payable										
Accrued expenses										
Operate loan-Current	165,000	139,027	109,938	77,358	40,868	16,818	18,786	21,096	23,628	24,288
<b>Current Liabilities</b>	<b>165,000</b>	<b>139,027</b>	<b>109,938</b>	<b>77,358</b>	<b>40,868</b>	<b>16,818</b>	<b>18,786</b>	<b>21,096</b>	<b>23,628</b>	<b>24,288</b>
<b>Long-term debt</b>	<b>712,750</b>	<b>672,135</b>	<b>626,645</b>	<b>575,697</b>	<b>518,635</b>	<b>454,726</b>	<b>383,148</b>	<b>302,980</b>	<b>213,192</b>	<b>112,630</b>
<b>Capital debt</b>										
<b>TOTAL LIABILITIES</b>	<b>877,750</b>	<b>811,162</b>	<b>736,583</b>	<b>653,055</b>	<b>559,504</b>	<b>471,544</b>	<b>401,934</b>	<b>324,076</b>	<b>236,820</b>	<b>136,918</b>
<b>EQUITY</b>										
<b>Business equity</b>	0	0	152,326	266,334	399,226	543,345	680,877	738,400	849,849	972,074
<b>Retained earnings</b>			11,183	208,652	533,295	1,010,495	1,590,762	2,336,449	3,161,371	4,143,274
<b>Current earnings</b>	1,386	1,006	148,195	275,368	427,925	585,094	659,948	736,872	891,320	1,057,468
<b>Less dividends paid</b>										
<b>TOTAL EQUITY</b>	<b>1,386</b>	<b>1,006</b>	<b>311,704</b>	<b>750,354</b>	<b>1,360,446</b>	<b>2,138,934</b>	<b>2,931,587</b>	<b>3,811,721</b>	<b>4,902,540</b>	<b>6,172,816</b>
<b>TOTAL LIABILITIES AND EQUITY</b>	<b>879,136</b>	<b>812,168</b>	<b>1,048,287</b>	<b>1,403,409</b>	<b>1,919,950</b>	<b>2,610,478</b>	<b>3,333,521</b>	<b>4,135,797</b>	<b>5,139,361</b>	<b>6,309,734</b>

The Cash flow shows the source and use of funds. Depreciation, debt service and interest expenses are added back in to the top section to reflect internal cash generation. Depreciation is added back in at the bottom of the chart as it is not an out-of-pocket expense.

PROFORMA CASH-FLOW											
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
<b>Tons Processed</b>	1.5	3.2	6.2	8	10	12	13	14	16	18	
<b>NET INCOME</b>	-185,784	-66,583	148,195	275,368	427,925	585,094	659,948	736,872	891,320	1,057,468	
<b>Addback:</b>											
<b>Depreciation</b>	49,275	49,275	49,275	49,275	49,275	66,954	66,954	66,954	66,954	66,954	66,954
<b>Debt Service (prin.)</b>	(40,568)	(45,436)	(50,889)	(56,995)	(63,835)	(71,578)	(80,168)	(89,788)	(100,562)	(98,114)	
<b>Interest expense</b>	(93,930)	(83,893)	(78,215)	(71,856)	(64,773)	(67,389)	(56,781)	(44,901)	(31,595)	(16,691)	
<b>CASH FROM OPERATIONS</b>	-2,011	112,021	326,574	453,494	605,808	791,015	863,851	938,515	1,090,431	1,239,227	
<b>Sources of Funds</b>											
BEGINNING CASH BALANCE	0	28,491	11,182	208,652	533,295	1,010,495	1,590,761	2,336,449	3,161,372	4,143,274	
<b>Total Income</b>	384,056	819,319	1,587,430	2,048,296	2,560,370	3,072,444	3,328,482	3,584,519	4,096,593	4,608,667	
Assets Sold											
Liabilities Incurred (equipment & structures)	712,750.00										
Operating line of credit	165,000										
<b>Total Sources</b>	1,261,806	847,809	1,598,612	2,256,948	3,093,665	4,082,939	4,919,243	5,920,968	7,257,964	8,751,941	
<b>Uses of Funds</b>											
Total Expense	503,299	811,377	1,355,766	1,679,444	2,032,646	2,398,954	2,569,579	2,736,762	3,081,082	3,428,796	
Assets Purchased	712,750					88,600					
Liabilities Repaid	(66,541)	(74,525)	(83,469)	(93,485)	(99,799)	(71,578)	(80,168)	(89,788)	(100,562)	(98,114)	
<b>Total Uses</b>	1,282,590	885,902	1,439,235	1,772,929	2,132,445	2,559,132	2,649,747	2,826,550	3,181,644	3,526,910	
<b>Net Cash</b>	-20,784	-38,093	159,377	484,020	961,220	1,523,807	2,269,495	3,094,418	4,076,320	5,225,031	
<b>Add back Depreciation</b>	49,275	49,275	49,275	49,275	49,275	66,954	66,954	66,954	66,954	66,954	
<b>Net Cash Available</b>	\$28,491	\$11,182	\$208,652	\$533,295	\$1,010,495	\$1,590,761	\$2,336,449	\$3,161,372	\$4,143,274	\$5,291,985	

The last chart is a listing of performance ratios or indicators commonly used in financial analysis. Appendix VI contains the Excel file showing the entire worksheet

with titled tabs along bottom of the sheet. The Excel file allows easier navigation through the worksheet.

PERFORMANCE RATIOS		Ratios Defined									
RATE OF RETURN 1		Net profit after tax/total equity									
RATE OF RETURN 2		Net profit (before depreciation) after tax/total equity									
RETURN ON ASSETS		Net profit/total assets									
RETURN ON SALES		Net profit/annual sales									
GROSS MARGIN PERCENTAGE		Sales - COGS / annual sales									
DEBT SERVICE COVERAGE		Earnings before depreciation, interest, taxes / int, princ. repayment									
CURRENT RATIO		Current assets/current liabilities									
INTEREST EXPENSE RATIO		Interest expense / Gross Revenue									
DEBT TO EUIY		Total liabilities/total equity									
NET INCOME FROM OPERATIONS		Net Income / Gross Revenue									
ANNUAL DEBT SERVICE		Annual interest and principal repayment									
NET PROFIT AFTER TAX		Annual company profits after tax									
INTERNAL RATE OF RETURN		Initial Investment / Annual Cash Inflows (see PV table)									
	Minimum	Year 1	Year 2	Year 3	Year 4	Year5	Year 6	Year 7	Year 8	Year 9	Year 10
RATE OF RETURN 1		24.0%	26.9%	20.3%	17.6%	15.2%	13.0%	12.0%	11.6%	10.5%	9.6%
RATE OF RETURN 2		29.6%	33.2%	25.1%	21.8%	18.8%	16.1%	15.8%	15.3%	13.9%	12.7%
RETURN ON ASSETS		24.0%	26.9%	20.3%	17.6%	15.2%	13.0%	12.0%	11.6%	10.5%	9.6%
RETURN ON SALES		13.3%	54.9%	25.7%	13.3%	10.3%	8.2%	6.9%	6.3%	5.9%	5.1%
GROSS MARGIN PERCENTAGE		30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%	30.9%
DEBT SERVICE COVERAGE		-1.1%	64.0%	186.7%	259.7%	348.5%	569.2%	630.8%	696.8%	825.1%	1079.4%
CURRENT RATIO		0.6	0.7	0.9	1.2	2.3	5.7	5.1	4.5	4.0	3.9
INTEREST EXPENSE		29.6%	12.3%	5.8%	4.0%	2.9%	2.2%	1.7%	1.3%	0.8%	0.4%
DEBT TO EUIY		633.30	-29.51	2.45	1.21	0.68	0.43	0.31	0.23	0.15	0.08
Income from Operations		-31.0%	1.0%	14.6%	18.0%	20.6%	21.9%	22.8%	23.7%	24.8%	25.6%
ANNUAL DEBT SERVICE		\$180,271	\$175,102	\$174,877	\$174,624	\$173,855	\$138,967	\$136,949	\$134,689	\$132,157	\$114,805
NET PROFIT AFTER TAX		-\$119,243	\$7,942	\$231,664	\$368,852	\$527,724	\$673,490	\$758,902	\$847,756	\$1,015,510	\$1,179,870

## Appendix I

### Initial Investment Loan Amortization:

Loan Amortization Schedule							
Equipment Loan							
Enter values				Loan summary			
	Loan amount	\$	712,750.00		Scheduled pay	\$	126,145.46
	Annual interest		12.00 %		Scheduled num		10
	Loan period in		10		Actual number		10
	Number of pay		1		Total early pay	\$	-
	Start date of lo		9/2/27		Total interest	\$	548,704.63
	Optional extra	\$	-				
Lender name:							
PmtNo.	Payment	Beginning Ba	Scheduled Payment	Total Paymen	Principal	Interest	Cumulative Interest
1	9/2/28	\$ 712,750.00	\$ 126,145.46	\$ 126,145.46	\$ 40,615.46	\$ 85,530.00	\$ 85,530.00
2	9/2/29	672,134.54	126,145.46	126,145.46	45,489.32	80,656.14	166,186.14
3	9/2/30	626,645.22	126,145.46	126,145.46	50,948.04	75,197.43	241,383.57
4	9/2/31	575,697.18	126,145.46	126,145.46	57,061.80	69,083.66	310,467.23
5	9/2/32	518,635.38	126,145.46	126,145.46	63,909.22	62,236.25	372,703.48
6	9/2/33	454,726.16	126,145.46	126,145.46	71,578.32	54,567.14	427,270.62
7	9/2/34	383,147.84	126,145.46	126,145.46	80,167.72	45,977.74	473,248.36
8	9/2/35	302,980.12	126,145.46	126,145.46	89,787.85	36,357.61	509,605.97
9	9/2/36	213,192.27	126,145.46	126,145.46	100,562.39	25,583.07	535,189.04
10	9/2/37	112,629.88	126,145.46	112,629.88	99,114.29	13,515.59	548,704.63

Appendix II

**Operating Capital loan**

Loan Amortization Schedule									
Operating Capital Loan									
Enter values					Loan summary				
	Loan amount	\$ 165,000.00			Scheduled pay	\$ 45,772.61			
	Annual interest	12.00 %			Scheduled num	5			
	Loan period in	5			Actual number	5			
	Number of pay	1			Total early pay	\$ -			
	Start date of lo	9/2/27			Total interest	\$ 63,863.03			
	Optional extra	\$ -							
Lender name:									
PmtNo.	Payment	Beginning Ba	Scheduled Pa	Extra Pay	Total Paymen	Principal	Interest	Ending Balan	Cumulative Interest
1	9/2/28	\$ 165,000.00	\$ 45,772.61	\$ -	\$ 45,772.61	\$ 25,972.61	\$ 19,800.00	\$ 139,027.39	\$ 19,800.00
2	9/2/29	139,027.39	45,772.61	-	45,772.61	29,089.32	16,683.29	109,938.08	36,483.29
3	9/2/30	109,938.08	45,772.61	-	45,772.61	32,580.04	13,192.57	77,358.04	49,675.86
4	9/2/31	77,358.04	45,772.61	-	45,772.61	36,489.64	9,282.96	40,868.40	58,958.82
5	9/2/32	40,868.40	45,772.61	-	40,868.40	35,964.19	4,904.21	0.00	63,863.03

Appendix III

**Vehicle Replacement Loan**

Loan Amortization Schedule									
Trucks added in year 6									
Enter values					Loan summary				
		<b>Loan amount</b>	<b>\$ 88,600.00</b>			Scheduled pay	\$ 24,578.50		
		Annual interest	12.00 %			Scheduled num	5		
		Loan period in	5			Actual number	5		
		Number of pay	1			Total early pay	\$ -		
		Start date of lo	9/2/27			Total interest	\$ 34,292.51		
		Optional extra	\$ -						
Lender name:									
PmtNo.	Payment	Beginning Bala	Scheduled Pay	Extra Pay	Total Payment	Principal	Interest	Ending Balanci	Cumulative Interest
1	9/2/28	\$ 88,600.00	\$ 24,578.50	\$ -	\$ 24,578.50	\$ 13,946.50	\$ 10,632.00	\$ 74,653.50	\$ 10,632.00
2	9/2/29	74,653.50	24,578.50	-	24,578.50	15,620.08	8,958.42	59,033.42	19,590.42
3	9/2/30	59,033.42	24,578.50	-	24,578.50	17,494.49	7,084.01	41,538.92	26,674.43
4	9/2/31	41,538.92	24,578.50	-	24,578.50	19,593.83	4,984.67	21,945.09	31,659.10
5	9/2/32	21,945.09	24,578.50	-	21,945.09	19,311.68	2,633.41	0.00	34,292.51

Appendix IV

**5000 Liter Plant Itemization:**

Also view this as attachment.



India 5000.pdf

Appendix V

## **Kadam Dairy Processing Equipment Bid**

### **KADAM DAIRY EQUIPMENTS PVT. LTD.**

FACTORY – PLOT NO. L-73, ADDL M.I.D.C. SATARA - 415 004. Ph – 247540.  
Office – 612 Vakil Nagar, Erandwane, Pune – 411 004. Ph – 25448796.

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#### **Manufacturers & Suppliers of all types of Dairy Equipments**

---

Our Ref. No. KDE/05-06/150 Date -  
06/01/2006

To,  
Ministry of Agriculture & Food  
Kart-I-Sakhi, Kabul,  
Afghanistan.  
Mob. 0093 (0) 799 015 359, (0) 70 260 389.

Kind Attn.: Mr. Andres Judeh.

Sub: Quotation for Milk Pasteurization Plant 3000 Exp. to 5000 LPD.

Dear Sir,

As per your discussion with undersigned, we are giving our lowest quotation with following terms & conditions.

Basic price of the project is Rs. 15.72 Lacs.  
(Rupees Fifteen Lacs Seventy Two Thousand only).

#### **TERMS & CONDITIONS :**

Price : Ex-works Satara.

Sales tax : No tax for export.  
 Other charges: Transportation, insurance, packing extra as per actuals to pay by You.  
 Validity : 30 days.  
 Warrantee : 12 calendar months from the date of dispatch/ commissioning  
 against any manufacturing defect and not for any deteriorate or electrical part.  
 Payment : 40% Advance against confirm order.  
 standard 60% Balance by Irrecoverable Letter of Credit of any Bank.  
 Delivery : Within 3 months from your confirm order / date of advance.

Assuring our best co-operation we look forward to hearing from you soon.

Thanking you.

Yours Faithfully,  
 For Kadam Dairy Equipments Pvt. Ltd.

Mr. M. S. Kadam  
 Managing Director

(Encl. - Quotation Details.)

KDEPL

A. MILK RECEPTION SECTION:

- |    |  |                                      |          |
|----|--|--------------------------------------|----------|
| 1. | Electronic Weigh Scale - Platform type.<br>Heavy duty support structure fabricated from MS.<br>Necessary arrangement to mount the weigh bowl.<br>Facility to interface with printer.   | 0-600 Kg.<br>Make - Essae<br>Teraoka | 1<br>No. |
| 2. | Weigh Bowl -<br>Bowl fabricated from 2mm SS304 sheet.<br>Complete with SS304 baffle plate, strainer cum antispash<br>and operating lever. The dead weight outlet valve will be<br>manufactured from SS304 and a disk shape. The sealing<br>gasket will be neoprene rubber. | 300 Lt.                              | 1<br>No. |
| 3. | Dump Tank -<br>Rectangular shape 2-mm thk SS304 sheet.<br>Slope from all the three sides for easy drain of liquid.<br>SS304 outlet with SMS unions and two-way valve 51 NB.<br>Legs with SS ball feet.   | 500 Lt.                              | 1<br>No. |

- |    |   |                                    |
|----|---|------------------------------------|
| 4. | SS Milk Pump -<br>Centrifugal pump with an open impeller. All the milk contact parts will of SS304. Connections are of SMS standards. | 2 HP    2<br>Make - Nos.<br>Zeuzer |
| 5. | Milk Strainer -<br>SS 304 disc type strainer with 1.5mm holes.<br>SMS union on both sides.  | STD    1<br>No.                    |

B. PROCESS AND STORAGE SECTION :

- |   |   |
|---|---|
| <p>1. Milk Pasteuriser -<br/>         Plate heat exchanger with SS304 plates.<br/>         Carrying bar, tightening bolts, nuts, ball feet, etc. will be of SS304.<br/>         Frame and pressure plate will be of MS and duly cladded by SS304.<br/>         Temp. programme 35°C – 80 - 4°C.<br/>         Chilling medium - 1.5°C water with flow rate three times the milk flow rate.<br/>         Heating medium - 83°C water with flow rate 1.2 times the milk flow rate.<br/>         Accessories - Float Balance Tank 100 Lt., Milk Pump, Simplex Filter 40 Lt., Manually Flow Regulating Valve.</p>  | <p>1000 LPH 1 Set<br/>         Make – Zeuzer.</p> |
| <p>2. Milk Homogenizer -</p>  | <p>500 LPH 1<br/>         Make Micron No.</p>     |
| <p>3. Horizontal Milk Storage Tank – Outer SS.<br/>         Cylindrical, horizontal, double walled design.<br/>         Inner shell and conical dish end 2mm thk SS304 sheet<br/>         Outer shell with conical dish ends 2mm SS304 sheet.<br/>         Insulation - 100-mm thk thermocole layer.<br/>         Mountings - Outlet, inlet, air vent, manway, sight glass and light glass assembly, level marks, agitator, gearbox, spray ball, sampling cock, thermowell, thermometer, legs, ladder, lifting lug, platform.<br/>         Painting and finishing - All the MS stiffeners and the outer shell used in the construction of the tank shall be painted with primer after thorough derusting. The outer shell shall be painted with two coats of Royal Ivory Dairy Colour.<br/>         All weld joints will be ground smoothly and polished to 150 grits.<br/>         Tests - A) Dye penetration test for welding joints.<br/>         B) Water fill up test of inner vessel for water tightness.</p> | <p>5000 Lt. 1<br/>         No.</p>                |
| <p>4. SS Pipes and Fittings -<br/>         All the milk carrying pipes required to interconnect above milk processing equipments will be of SS304.</p>  | <p>Ø 38-mm 1 Lot</p>                              |

C. REFRIGERATION SECTION :

- |  |  |
|--|--|
| 1. Supply of Evaporator:<br>Copper tubing having enough surface area to built ice which is necessary to chill milk.  | STD. 1 Lot                                 |
| 2. Supply of material of MS Chilled Water Tank :<br>Bottom and side plate MS 3-mm thk. with all necessary stiffeners<br>Connections - Outlet, overflow, drain.<br>Painted with bituminous anticorrosive paint.<br>Top of the tank will be provided with bhabul wood covers (20mm thk).<br>Insulated with 100mm thick thermocole from all sides and bottom. | Size (L x B x H) 1 Lot<br>m<br>4 x 2 x 1.2 |
| 3. Supply of Chilled Water Pump:<br>Centrifugal monoblock pump with TEFC squirrel cage induction motor operating on 3 phase 400/440 V AC electrical supply.  | 2 HP 1<br>No.                              |
| 4. Supply of Chilled Water Agitator:<br>Cast iron, vertical, submerged in water, propeller type agitator with TEFC squirrel case induction motor.  | 2 HP 1<br>No.                              |
| 5. Supply of MS Pipes and Fittings:<br>MS 'C' class pipes and fittings for chilled water line,<br>Insulation – 2” thk thermocole pipe sections with 26 g cladding.   | STD. 1 Lot                                 |
| 6. Refrigeration controls:<br>Necessary controls and pressure gauges, temperature gauges will be provided.   | STD. 1 Lot                                 |

D. HOT WATER SECTION:

- |   |                       |
|---|-----------------------|
| 1. Supply of MS Pipes and Fittings:<br>MS 'B' class pipes and fittings for hot water line,<br>Insulation – 2” thk glasswool with 26 g cladding.   | STD. 1 Lot            |
| 2. Hot Water Tank:<br>Rectangular shape 2-mm thk SS304 sheet.<br>Slope from all the three sides for easy drain of liquid.<br>SS304 outlet with MS flange and GM globe valve Ø2”.<br>Connections - Drain, return inlet and removable top<br>cover. | Cap. 500 Lt. 1<br>No. |
| 3. Supply of Hot Water Pump:<br>Centrifugal monoblock pump with TEFC squirrel cage<br>induction motor operating on 3 phase 400/440 V AC<br>electrical supply.   | 2 HP 1<br>No.         |

**Price –**

SR. NO.	DESCRIPTION	QTY	PRICE
A) MILK RECEPTION SECTION -			<b>182,000.00</b>
1.	Electronic Weighing Scale - 0-600kg.	1 No.	60,000.00
2.	Weigh Bowl - Cap. 300 Lt.	1 No.	30,000.00
3.	Dump Tank - Cap. 500 Lt.	1 No.	45,000.00
4.	SS Milk Pump - Cap. 2 HP, Make - Zeuzer.	2 Nos.	40,000.00
5.	Inline Strainer -	1 No.	7,000.00
B) PROCESS AND STORAGE SECTION -			<b>860,000.00</b>
1.	Milk Pasteuriser - Cap. 1000 LPH. Make Zeuzer.	1 No.	250,000.00
2.	Milk Homogenizer - Cap. 500 LPH. Make Micron.	1 No.	340,000.00
3.	Horizontal Milk Storage Tank – Cap.5000 Lt. (SS Outer)	1 No.	200,000.00
4.	SS Pipes And Fittings	1 Lot	70,000.00
C) REFRIGERATION SECTION		1 Lot	<b>400,000.00</b>
D) HOT WATER SECTION		1 Lot	<b>80,000.00</b>
E)		1 Job	<b>50,000.00</b>
<b>ERECTION AND COMMISSIONING</b>			
TOTAL COST			<b>15,72,000.00</b>

APPENDIX VI

PROCESSING PLANT FINANCIAL ANALYSIS EXCEL SPREADSHEET

See Excel attachment

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