Inma Agribusiness Program

Al-Anbar Dairy Industry Feasibility Study

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AL-ANBAR DAIRY INDUSTRY FEASABILITY STUDY

FOR THE AL-ANBAR PROVINCIAL COUNCIL – AGRICULTURAL COMMITTEE

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Table of Contents

INTRODUCTION.....2

FEEDS NEEDED AND MARKET PRICES 5

PROJECTED OPERATING EXPENSES.....5

PROJECTED GROSS INCOME AND RETURN ON INVESTMENT.....6

Gross Milk Production 6
Determining Market Price for Milk 7

Projected Cost of Production.....7
In Gross Dollars.....7

CONCLUSIONS.....8

RECOMMENDATIONS.....9
Milk Collection Center with Cooling Tanks 9
Dairy Plant Construction.....9

Calf – Heifer Feedlot 10
Annual Projected Budget for Raising 200 Calves and Heifers 10
Build a Less Expensive Milking Parlor.....11

Introduction

The Al-Anbar Provincial Council Agricultural Committee and the Al-Anbar PRT requested the *Inma* Agribusiness Program to do a feasibility study on establishing a dairy production center. At the suggestion of the Council, the analysis examines a 300-cow dairy including buildings and land, cattle, cropping program, employee training, and projected operating expense to determine the investment needed, and the return on investment. The goal of this activity is to reestablish the dairy industry in Anbar with locally purchased cows, providing locally produced dairy products, and local jobs.

There are major challenges that will affect the dairy industry in Anbar and they are:

- **Imported dairy products and powdered milk** – Because most of the dairy products sold in Iraqi are imported or produced here from imported milk powder, locally produced milk must be able to compete. The imported milk powder will set a ceiling on local milk prices.
- **High summer heat** – Dairy cows do not produce at their best in very hot weather. Shade buildings with water mist cooling are included in the building plan, but even that investment will not entirely correct the heat stress.
- **Security** – A security force was included as a farm operating expense. Hopefully this problem will lessen over the next two years.

The information that follows is the best estimated figures from the Iraqi, PRT, and *Inma* experts using their collective knowledge and experience to assign prices to land, buildings, cattle, machinery, and employee training. They also projected the total milk produced and gross milk income, and the operating expenses. All figures are in US Dollars. This report will provide information that will assist in the decision to invest in this venture or not. The report will conclude with recommendations and other considerations.

Capital Investment			
Land	**Number**	**Cost/unit**	**Total Capital**
Irrigated Hectors	360	$250	$90,082
Irrigation Equipment Repair	10	$35,000	$350,000
Land for farmstead	10	$250	$2,500
Total Land Investment			**$442,582**
Buildings	**Number**	**Cost/unit**	**Total Capital**
Feedlots shade bunk	1	$3,000	$3,000
Maternity pen	1	$1,000	$1,000
Individual calf pens	25	$200	$5,000
4 lots for cows	4	$5,000	$20,000
5 lots for heifers	5	$2,000	$10,000
Milking parlor & equipment	1	$500,000	$500,000
Milk cooling tank	1	$50,000	$50,000
Vet clinic& treatment center	1	$55,000	$55,000
Office management & vet	1	$2,000	$2,000

Hay & Straw storage	1	$5,000	$5,000
Grain storage	1	$3,000	$3,000
Silos for corn silage	2	$10,000	$20,000
Machinery storage	1	$10,000	$10,000
Home - Grounds keeper	1	$10,000	$10,000
Building Investment			**$694,000**
Cattle	**Number**	**Cost/unit**	**Total Capital**
Purchased cows	**300**	**$2,000**	**$600,000**
Machinery	**Number**	**Cost/unit**	**Total Capital**
Tractors	4	$36,000	$144,000
Plows, cultivators	3	$4,000	$12,000
Planters	2	$15,000	$30,000
Loader for Tractor	1	$2,000	$2,000
Trailers	4	$ 5,000	$20,000
Mower for hay	1	$15,000	$15,000
Hay rake	1	$2,000	$2,000
Hay Baler	1	$20,000	$20,000
Field Chopper silage	1	$30,000	$30,000
Trucks	3	$10,000	$30,000
Manure Handling equip	2	$ 20,000	$40,000
Generators	2	$100,000	$200,000
Total Machinery			**$545,000**
TOTAL INVESTMENT			**$2,231,582**

Comments on Capital Investment Table:

- Land prices will depend on what the government charges the project for land use. The committee did not know what that would be.
- Irrigation equipment and canal repair will be a major item. The figures include two diesel water pumps and pipes.
- Remember these figures are an educated calculated projection but most likely not completely accurate. If any thing, the final cost will be higher and not lower.
- During the first two years of operation, there will be no young stock coming into the herd from the replacement program, so to maintain a 300 cow herd, additional cows will have be bought. Five to ten percent of the cattle will need to be replaced each year due to death, injury, infertility, etc. Loss rates will be greater in the beginning due to lack of experience of your management team and employees.
- A consultant with experience setting up large modern dairies should be hired to help design the buildings and cow movement patterns, and manage the construction process.

MANAGEMENT TRAINING	
Manager	$80,000
Herdsman	$80,000
Herd Veterinarian	$80,000
Management Training	**$240,000**

Comments on management training:

- The most important investment of a production farm is management training. Managing a producing dairy is one of the most difficult jobs in production agriculture.
- If your manager, herdsman, and veterinarian are not properly prepared, the project will fail.
- Either an experienced western manager should be brought to Iraq to train you management team from the first day of operations, or your team should go to a western dairy for at least 6 months to work with good managers before the herd is bought.
- Every major dairy project observed by the assembled experts failed when the owners overlooked this important investment.

Feeds Needed and Market Prices

A production curve for a normal 5,100 liter cow including early production, mid-lactation, late lactation, and dry period was developed, and a complete balanced ration was done for each of the lactation and dry groups. The replacement herd was divided into 4, 8, 14, and 18 month old heifers, and a balanced ration was developed for each group. Using this information, we calculated the total tons of each feed ingredients needed, and the hectors to grow it. Added to this information was the best know market prices of each feed ingredient.

The farm manager must know the cost of growing each feed ingredient, and constantly compare that to the local market price. Sixty percent or more of the total farm operating cost is feed cost whither it is grown by the farm or purchased. Because of the narrow margins of profit in dairy farming, the farm manager must be always evaluating input cost.

	Tons	Irrigated Hectares Needed of each crop	Market Price/ton	Total Feed Cost
Alfalfa-grass Hay	855	107	$150	$128,279
Corn silage	1343	45	$60	$ 80,593
Wheat Grain			$325	
Barley Grain	639	160	$300.00	$191,696
Corn Grain			$ 30.00	
Soybean OM	86		$ 580	$ 49,950
Phos Monosodium	2.81		$500	$ 1,405
VetADE	1.81		$ 500	$ 903
Trace mineral Mix	1.81		$ 500	$ 903
Salt	4.42		$150	$ 662
Molass	6.22		$300	$ 1,866
		312		$456,260.59

Comments on Feed Needs and Feed Prices:

- The first column list the feeds needed based on the balanced ration in tons.
- The second column list the hectors needed to grow the feed based on yields suggested by the Committee.
- The third column is the market prices in Iraq.
- The fourth column is the price if we purchased all the feeds.
- Information was used in preparing the farm operating budget, and to determine whether to buy or grow a feed

PROJECTED OPERATING EXPENSES

The following projected operating expenses are for the third year of production. By then the calves born from the original herd will start to calve and will be available to replace lost, sick, infertile, or low producing cows. Therefore, this information is more valuable for projecting long term results. To compare the cost of growing all the cattle feed or purchasing it, two parallel operating budgets were prepared. In the following chart, the figures in black with the column titled “Grow most feed” are for growing all feeds except soybeans for the producing herd and heifer replacements. The figures in the column titled “Purchase All Feed” are for

purchasing all feeds. As you can see, growing most feeds is the least expensive at present. That could change over time as farmers in Iraq become more efficient growers of hay and grain.

Operating Expenses	Number All Feed	Cost/year Feed in USD	Purchase in USD	Grow most in USD
Manager	1	15,000	15,000	15,000
Herdsman	2	10,000	20,000	20,000
Labor	20	4,000	50,000	80,000
Security	5	5,000	25,000	25,000
Veterinarian	2	12,000	24,000	24,000
Vet & Drugs	300	20	6,000	6,000
Fertilizer	365	125		45,625
Seeds and spray	365	150		54,750
Purchased feed	86	400	456,261	34,400
Artificial Insemination	500	20	10,000	10,000
Land rent or taxes	365	20		7,300
Interest on loans	0	-		-
Funds for Replacement & Repair (depreciation)	10	1,189,000	64,400	118,900
Fuel and oil (Field Crops)	58400	0.60		35,040
Fuel for generator	20000	0.60	12,000	12,000
Fuel for irrigation Water	36000	0.60		21,600
Trucking			20,000	20,000
Purchased Cows 10%	30	2,000	60,000	60,000
			762,661	**589,615**

Comments on the operating budget:

- The operating budget is for a 300 cow milking herd, and 250 herd replacements (calves 2 -4 months old, open heifers 4 – 15 months old, and bred heifers 16 – 24 months old).
- The amounts and types of forages and grains needed for a 300 cow herd producing an average 5,100 liters per cow per year, and their growing offspring were used to calculate the feed and/or crop expenses.

PROJECTED GROSS INCOME AND RETURN ON INVESTMENT

To determine the gross income from milk sales, a reasonable production level and market price was agreed upon.

Gross Milk Production

With out going into all the details of a normal cow lactation curves, dry periods, and average daily production per cow, 5,100 liters per cow per year average was agreed upon. That production level is achievable but will require excellent herd management.

- 5,100 l x 300 cows = 1,530,000 total liters milk production per year
- Calves on milk – New born calves will be on a milk diet for the first two months of their lives. On average a 300 cow herd will have 20 calves on milk at any one time.
- 20 calves x 2 liters of milk x 365 days = 14,600 liters
- 1,530,000 liters – 14,000 liters for calves =

- **1,515,400** liters to market

Determining Market Price for Milk

As stated earlier in this report as challenges affecting milk production in Iraq, the world price of milk powder will be the ceiling price for milk. According to the USDA-FAS projected World Milk Powder prices for 2008, they project the price will be between $3,000 and $4,000 per metric ton. The following chart converts powder prices per ton to reconstituted liquid milk prices per liter:

Price/ton	Price/liter reconstituted milk
$4,000	$ 0.52
$3,500	$0.46
$3,000	$0.39
$2,500	$ 0.33

This provides a range for which Iraq farm gate milk prices might be during 2008 and probably into the near future.

Projected Cost of Production

To determine the price per liter cost, divide the Farm Operating cost by the liters to be sold:

Budget growing feed
$589,615 by 1,515,400 liters = **$0.389 / liter**
Budget buying feed
$762,660 by 1,515,400 liters = **$0.503 / liter**

In Gross Dollars

Using $3,000 dollars per ton or $0.39 /liter the farm will gross $591,006 in milk sales, and generate $589,615 in operating expenses leaving a **$1,391** return on the investment per year. The farm gate milk price could be higher or lower. Operating the farm on all purchased feed is not an option. If the operating budget for purchased feed is applied, the operating lost would be - $171,655.

Conclusions

- The production center will not be profitable for the first five years and most likely longer, however below are recommendations that would improve the profit margin and would provide a return on investment.
- The Al-Anbar Provincial Council must decide if it is willing to invest $2,231,582 knowing they will have to subsidize operations, and have no return on their investment for at least 5 years.
- With the narrow profit margin, slight changes in the milk price will affect profitability both positively and negatively.
- Training the management team is very important. Knowledge concerning herd management, health, and nutrition is changing every day, so the management team must continually be learning.
- Shade and cooling system for the cows becomes more important as production levels improve with better genetics and management.

Recommendations

The analysis thus far has concentrated on the production side of the dairy industry development plan. Though it may not be as profitable as we had hoped, there are a few different concepts and approaches that should be considered. A small to moderately sized milk plant will not be able to operate efficiently or supply its customers adequately if its only source of milk is a 300 cow dairy. It will need other sources and an even supply year around. Collecting local milk from small farmers and purchasing powder milk reconstitution equipment in the milk plant are possible sources of milk. Since we assumed that the World Powder Milk price would set Iraqi milk prices, powder milk would assure the plant of a guaranteed source. To lower cost on the farm, consider a less expensive milking parlor, and a different method of purchasing local cattle.

Milk Collection Center with Cooling Tanks

- Milk collection centers with cooling tanks could be established in villages in the region of a dairy plant.
- The centers could be owned and operated by the dairy plant, private individuals, or farmers associations.
- Farmers would bring milk to center 2 times a day after milking where milk is cooled to 3 degrees C.
- Trucks take milk to plant every other day.
- Better quality milk will be collected verses just picking up warm milk hours after the cows are milked, however over all milk quality and safety will be easier to control on the larger 300 cow farm.
- Farmer's income improves and people enjoy a better standard of living.
- Bigger farmers will emerge over time.
- Price the milk purchased from local farmers at World powder prices minus the cost of running the collection center and hauling.
- Security would improve.

Dairy Plant Construction

- Even with the 300 cow dairy in full production, it will not provide enough milk to keep a moderately sized dairy plant producing at the most efficient levels.
- Locate a dairy plant in an urban center to manufacture marketable dairy products.
- Local milk, from near by villages with milk cooling collection centers could supply some of the plants milk needs. This would benefit small farmers, and improve the local economy.
- Local economy and jobs would improve
- Community pride would improve.
- A powdered milk reconstitution machine should be included in the purchased equipment. This would assure a constant supply of milk when local sources do not meet the plants needs and the market demands.

- Milk prices paid to local farmers should not exceed the purchase price of powdered milk.

Calf – Heifer Feedlot

Rather then build the entire dairy production facility now and stock it, consider just building the heifer and calf part. If you purchase 300 mature cows, there is a good chance that a lot of the cows will not be good producers, have disease, or be stunted from poor nutrition. Instead, buy 300 heifer calves at weaning age, put them in the feedlots, feeding them a balance ration, breed them artificially when they are of age, and in two years you will have a much better 300 cow herd.

- Heifers and calves need much less sophisticated management.
- Less security is needed
- Much less capital is needed the first 2 years
- You have two years to develop your management team for the larger operating dairy
- You have time to plan and build the milk production center
- You will have 300 better cows then if you purchased mature cows.
- You will have better disease control.
- In two years the security situation could be better, and less of a burden.
- If the production center development is stopped, the bred heifers can be sold to the other farmers.
- The feedlot can then be used to raise more heifers, become a beef feedlot, or both.

Annual Projected Budget for Raising 300 Calves and Heifers

Herdsman	$10,000
Labor	$16,000
Security	$10,000
Veterinarian	$ 3,000
Vet & Drugs	$ 1,500
Fertilizer	
Seeds and spray	
Purchased feed	$172,901
Artificial Insemination	$ 8,000
Land rent or taxes	
Interest on loans	
Funds for Replacement Repair	$2,000
Fuel and oil	
Fuel for generator	$5,000
Fuel for Pumping Water	$2,000
Trucking	$5,000
Purchase 300 weaned calves	$30,000
Projected annual cost	**$ 265,401**

- The projected operating budget for just a 300 head heifer operation per year is **$265,401** or **$885** per head per year.
- The project total expense to raise a calf-heifer for two years to maturity is **$1,769**. In the original operating budget we put the purchase price of each cow at **$2,000**.

- The costs are not too far apart, however by raising the cows from calves, the animals will be better producers, and have less disease problems. This would improve the chances of getting a 5,100 liter herd average.

Build a Less Expensive Milking Parlor

The milking parlor does not have to be a modern labor efficient unit. There are other choices that produce high quality milk.

- Build a flat parlor with 50 to 100 stalls, and a pipeline milking unit.
- Cows would be milked in shift of 50 or 100, and a barn crew could change the cows at one end of the stall barn while the milkers are on the other end.
- This is called the California Flat parlor. It requires more labor, but Iraq is not a high cost labor country.
- Time efficiency is just about as good, but is more labor intense.
- Milk quality is just as good, because a pipeline milker would deliver the milk directly from the cow to the bulk milk cooling tank.

The PRT and *Inma* will be glad to provide technical advice to the Committee if they wish to proceed with the original plan or explore any of the alternatives. Expensive labor saving technology is not always practical in a country where labor is low cost.