DAIRY SECTOR INVESTMENT OPPORTUNITY BRIEF

Extended Shelf Life Products
(Milk, Cheese, Butter, Yogurt)




EXECUTIVE SUMMARY

I2 acts as a financial advisor, typically either in behalf of businesses, which possess workable business concepts and management skills or in behalf of investors seeking attractive returns. What follows in a concrete example of the kind of " bridge building" analysis and due diligence which we are able to perform in behalf of either or both parties.

This dairy sector investment opportunity brief highlights the establishment of a dairy processing facility to produce milk by-products that have an extended shelf life. The processing capacity of the facility is assumed to be 1,800,000 liters of raw milk into four product categories; pasteurized milk, cheese, butter, and cream.

The average annual demand in Ethiopia for dairy products in the next ten years (2013-2022) is expected to reach $1 billion. This is as a result of the current high population and future growth trends, a growing number of urban centers and urbanized lifestyles, and finally steadies economic growth rates registered by the country and visible increased income levels of the general population.

The total investment requirement is estimated at approximately $227,000, out of which $65,789 is required for the processing plant, $137,316 is for processing machinery and other equipments, and $13,158 for milk collecting cans. The farm will create employment opportunities for 14 individuals and provide steady and secure income for 1,250 smallholder farmers (out-growers).

The project is financially viable with an average annual net profit of $129,761, an average net profit margin of 9.2%, and a ten-year internal rate of return (IRR) of 35.4%.

PRODUCT DESCRIPTION

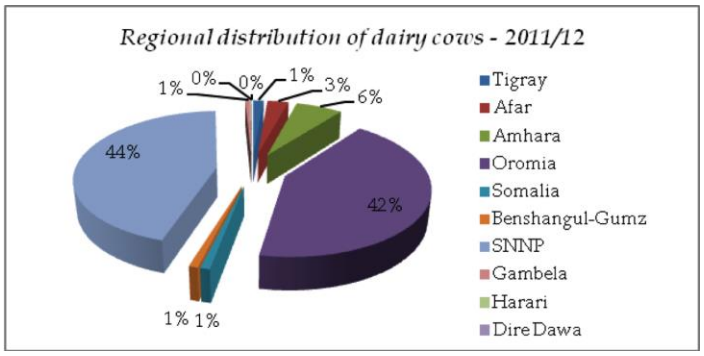
Processing raw milk produces a number of products such as, pasteurized milk, yogurt, cheese and butter. The project is going to collect raw milk from producers (5,000 liters per day) in a select milk-shed area, further process into pasteurized milk, cheese, butter, and yogurt. The output of each product type is as follows; 324,000 liters of pasteurized milk, 90,000 kg of cheese, 14,400 kg of butter, and 9,000 kg of yogurt. The final product will be distributed to urban areas that are increasingly consuming these by-products, especially cheese. The products will be supplied to retailers and in some instances to direct end-users such as hotels, restaurants, and café's.

MARKET BACKGROUND

Dairying is practiced almost all over Ethiopia involving a vast number of small or medium or large-sized, subsistence or market-oriented farms. Based on climate, land holdings and integration with crop production as criterion, dairy production systems are recognized in Ethiopia; namely the rural dairy system which is part of the subsistence farming system and includes pastoralists, agro-pastoralists, and mixed crop–livestock producers; the peri-urban; and urban dairy systems. The first system (pastoralism, agro-pastoralism and highland mixed smallholder production system) were found to contribute to 98%, while the peri-urban and urban dairy farms produce only 2% of the total milk production of the country (Sintayehu et al 2008).

Ethiopia leads the continent of Africa in cattle population and has the tenth largest in the world. The country was reported to have approximately 52 million cattle in 2012; the female constituting about 55.57 percent. During the same reporting period, it was also estimated that 10.6 million milking cows and 7.2 million dairy cows were kept by households. In terms of regional distribution, the SNNPR had the largest dairy cows population, closely followed by the Oromia region and with the Amhara region having third place with a 6% share or slightly over 3 million cattle's[1].

[1] Central Statistics Agency; 2012



Despite the country's large cattle population, the dairy sector has not yet fully developed. Milk production is minimal as local producers are still largely dependent on local breeds with an average daily production of 1.5 liters per day. Hybrid and exotic breeds account for only 0.93 percent and 0.12 percent, of the total number of cattle. The Ethiopian Central Statistics Agency (CSA) estimated that 3.33 billion liters of cow milk was produced in the year 2012 with an average daily production of 1.54 liters per cow. 83% Eighty three percent of the milk produced came from cattle while the balance coming from goats, camels and sheep.

SUPPLY

Looking at the commercially produced dairy products, CSA reported the country produced 242,564 hectoliters of pasteurized milk in 2009/10, which was sold for Birr 1,072 per unit (10.72 per liter). The amount and the average producer's price of other commercially produced dairy products are indicated in the following table.

PRODUCT TYPE	UNIT	PRODUCTION	AVG. PRICE
Milk Pasteurized	Liters	242,564,000	10.72
Butter and Ghee	Tons	982	47,806
Cheese	Tons	185	46,756

Source: Annual Manufacturing Survey, CSA Ethiopia, 2010

The milk producers and processors association consist of 33 large and medium scale dairy processors and another 19 small-scale dairy processors. 18 of these processors are located in and around Addis to benefit from the better infrastructure and market.

DOMESTIC DAIRY PRODUCTION				
Year	**Milk (HL)**	**Butter (Ton)**	**Cheese (Ton)**	**Yogurt*(Ton)**
2002	89,382	384	166	18.41
2003	107,469	180	140	21.46
2004	121,739	339	189	24.64
2005	135,077	394	104	27.17
2006	162,103	588	122	32.83
2007	134,617	354	480	27.75
2008	146,291	365	236	29.54
2009	160,927	611	270	32.94
2010	242,564	982	185	49.33

Source: - CSA, Large and Medium Scale Manufacturing and Electricity Industries Survey, Various Issues.

*Estimated as 0.2% of total annual production of the four diary products (based on DDE data)

A key challenge for the Ethiopian dairy sector is mitigating the seasonality that affects both supply and demand. The seasonal mismatch between dairy supply (shortage in the months before the rainy season) and demand (drop during fasting months) warrants investment in prolonged shelf life for milk. Seasonal fluctuations in the demand of dairy products follow the various fasting periods during which orthodox Christians will abstain from consuming all kinds of animal product foods. This occurs especially during the long fasting seasons of Hudade (a 55 days fasting period usually between March and April) and Filseta (a 16 day fasting period between the 7th up to the 22nd of August). Other fasting periods also include Wednesdays and Fridays of every week, Yesene tsom, Yetsege tsom and Yegena tsom. Overall, there are 196 fasting days in a year.

Producers are the most affected by the seasonal fluctuations as processors adjust the milk they collect according to the prevailing demand and or reduce their purchasing price. Most processors also produce long shelf life dairy products (Such as butter and cheese) to be sold after the fasting season. However, producers do not have the means to process and store their milk. Therefore they are obliged to feed their milk to cattle.

Dairy supply has a wet season peak and a dry season dip - a reported difference of 50% to 60%. For processors, the fasting months are the most difficult: processing facilities cannot function at full capacity, while product diversification (for example by producing cheese instead of pasteurized milk) may prove to be a solution to overcome the temporal dip in demand for milk products.

DEMAND

Demand for standard diary products from the modern sector is met by domestic production and through imports. The demand for milk depends on many factors including consumer preference, consumer's income, population size, price of the product, price of substitutes and other factors. In general, increasing population growth and rising real income are expected to expand the demand for milk and milk products. Population in Ethiopia is estimated to grow at 2.9% per year while the urban population increases at a rate of 3.6 %. Therefore, increase in population growth and consumer income in the future is expected to increase the consumption of milk products.

In Ethiopia, the demand for milk products is increasing while supply is lagging. Constrained by cows' nutrition, genetics and health, producers are not able to keep up with demand. As a result, imports have surged in recent years, which consist primarily of processed milk, including cheese and milk powder (81% of imports).

Dairy	Production	Imports	Exports
2005	$669,000,000	$5,392,818	$61,218
2006	$719,000,000	$7,231,989	$76,220
2007	$818,000,000	$5,378,343	$46,500
2008	$1,026,000,000	$7,745,448	$79,514
2009	$870,000,000	$9,571,583	$107,496
2010	$919,000,000	$16,295,663	$223,381
2011	$1,271,000,000	$9,257,429	$178,268

To meet the unsatisfied demand Ethiopia also imports dairy products from abroad.

IMPORT OF DAIRY PRODUCTS				
Year	**Milk**	**Butter**	**Cheese**	**Yogurt**
2001	13.1	4.4	19.1	2.4
2002	21.1	7.0	12.3	0.8
2003	3.8	1.8	19.3	2.6

2004	4.0	11.4	45.3	1.2
2005	17.9	2.1	55.0	4.6
2006	18.3	25.3	58.1	5.1
2007	38.5	16.3	58.1	7.8
2008	322.9	14.2	60.8	8.9
2009	46.3	32.7	70.3	6.8
2010	84.3	3.9	78.5	7.7
2011	165.0	12.8	98.3	11.9

Source: Ethiopian Revenue and Customs Authority. *Projection estimates

Ethiopia's per capita milk consumption rate is 23.38 liters per annum, with an estimated population size of 85 million; it is assumed that the current milk demand is approximately 19.8 million hectoliters.

DEMAND PROJECTIONS (2013-2022)				
Year	**Pasteurized Milk (HL)**	**Butter (Tons)**	**Cheese (Tons)**	**Yogurt (Tons)**
2013	295,403	3,501	1,636	243
2014	314,662	3,718	1,736	258
2015	335,138	3,949	1,841	274
2016	356,906	4,193	1,953	291
2017	380,047	4,453	2,072	308
2018	404,645	4,729	2,198	327
2019	430,791	5,021	2,331	347
2020	458,580	5,332	2,473	368
2021	488,114	5,661	2,623	391
2022	519,501	6,011	2,783	415

PRICING

The price of pasteurized milk in Addis Ababa is approximately varies between $.95 to $1.11per liter, while in other urban cities, such as Bahir Dar, fetch as high as $1.47 per liter. For the proposed project, the suggested price is $.95, at the lower tier of pricing, to increase sales and awareness of product. Cheese, butter, and yogurt products suggested sales price is at existing average market rates of $6.32, $6.32, and $1.58 per kilogram, respectively.

PLANT CAPACITY

Based on the projection demand level for dairy products, the envisaged plant will have a capacity of processing 1,800,000 liters of raw milk per annum producing 513,000 liters of pasteurized milk, 90,000 kilograms of cheese, 342,000 liters of yogurt, and 5,400 kilograms of butter per annum at full operation capacity. This capacity is proposed on the basis of a single 8-hour shift per day and 360 working days per annum. The processing plant will start production at 85% of its installed capacity, which will grow to 90% in the second year. Full capacity production will be attained in the third year and onwards.

RAW MATERIALS

The principal raw material required for the production of pasteurized milk, butter, cheese and yoghurt is raw milk. In addition, small quantities of coagulation enzymes and salt are also required for the production process. The raw (whole) cow milk and salt are available locally while the coagulation enzymes have to be imported. The auxiliary materials required for the envisaged plant comprise packing materials like 200 cc plastic bags, 40 gm

glycine paper and carton box. The plastic bags and carton boxes can be acquired from the local market while the glycine paper has to be imported.

UTILITIES

The major utilities required by the envisaged project are electric power, water and fuel oil. The cost of these services is estimated to be minimal at slightly above $1,000 per year.

PRODUCTION PROCESS

Processing of raw milk mainly involves heat treatment operation usually known as pasteurization and sterilization. A weighed amount of raw milk is pumped to a clarifier by means of the milk pump, where it is removed of microscopic impurities. Clarified milk is then sent to the cooler where it is cooled to about 2-5^{o}C, then pumped to the storage tank. The milk is, then, preheated and pasteurized to a temperature of about 80^{o}C by heat exchange. Further, by the effect of ultra-high temperature sterilizer, the fatty ingredients are homogenized in the homogenizer and recycled to the ultra-high temperature sterilizer where it is pasteurized instantly in about 2 seconds at high temperature of 135^{o}C. Finally, cooling is achieved by means of chilled water to lower the temperature to 3^{o}C, after which the milk is stored in the surge tank for filling into suitable containers for various uses. After such a process, a specified quantity of the milk is sold as a pasteurized product while the remaining portion is further processed in the plant for the production of other milk products such as butter and cheese.

Whole milk is partially or totally separated to produce standardized whole milk with 3.25% milk fat, low fat milks, 1 - 2% milk fat, and skim milk. After separation, cream is held in stainless steel tanks and refrigerated at (4 - 7^{o}C). The separated cream is pasteurized in order to destroy bacteria. Following pasteurization, rapid cooling is conducted to facilitate the formation of butter by a churning process. By continuous churning, the entering cream will be pasteurized giving tempered cream, which is further agitated vigorously by beater bars. This action causes stripping of the fat globule membrane and aggregation of the fat into chunks. Finally, a continuous ribbon of yellow butter streams from the end of the continuous churn and butter as a product drops into a hopper, where it is transferred to packing machinery.

Cheese is made from pasteurized skim milk, and in form of discrete particles classified as small or large curd. A curd forms when the increasing lactic acid of milk during fermentation attains the isoelectric point of casein at pH 4.6. This soft curd additionally contains lactose, salt and water. Afterwards, the curd matrix is cut and cooked to about 126^{o}F (52^{o}C). Separation of whey from the curd is rapid, and is followed by two or three water washings at warm to chill temperatures. Washing removes whey from residues and acts as a cooking medium. After drainage of the last wash water, the chilled curd is blended with a viscous, salted cream dressing to give 4.2% fat and 1% salt, and is packaged.

ENVIRONMENTAL IMPACT

The dairy products plant does not have any pollutant emitted from the production process, except the washing water, which has to be connected to appropriate sewerage line to get rid of. Thus, the envisaged project is environment friendly.

MACHINERY AND EQUIPMENT

The plant machinery, equipment required for the project is estimated to cost $171,000. These include the necessary inputs and equipments to produce milk, cheese, butter, and yogurt.

LAND, BUILDINGS AND CIVIL WORKS

Total land area required is 1,000 square meters out of which 300 square meters are built – up area. The construction cost of buildings and civil works at a rate of Birr 4,500 per m2 is estimated at $78,947.

Land can be leased from the City Administration, and as such, the cost of leasing land in the outskirts of Addis Ababa is estimated to be $13.94 per m2. The total cost of leasing land for 60 years is $10,461.

STAFFING

The total human resource required for the envisaged plant is 14 persons. The estimated annual salary requirement is anticipated to be $33,474. At time of processing machine installation, training will be provided to operators and management team on how to properly operate and maintain equipment.

FINANCIAL ASSUMPTIONS

The financial model of the project is based on the following assumptions;

Product Mix & Sales

Product Mix	Raw Milk (Ltr)	Product (Kg)	Product (Kg)	Price (kg)	USD
Milk (30%)	1,500	1,425	513,000	0.95	486,000
Cheese (50%)	2,500	250	90,000	6.32	568,421
Butter	-	15	5,400	6.32	34,105
Yogurt (20%)	1,000	950	342,000	1.58	540,000
	5,000	Daily	Annualy		1,628,526

Raw Material Cost

Product Mix	Milk (Ltr)	Product (Kg)	Price (Kg)	USD
Milk (30%)	1,500	540,000	0.63	341,053
Cheese (50%)	2,500	900,000	0.63	568,421
Butter	-	-	-	-
Yogurt (20%)	1,000	360,000	0.63	227,368
	5,000			1,136,842

Product Yield

Product	Yield (ltr)
Milk	95.0%
Cheese	10.0%
Butter	1.0%
Yogurt	95.0%

TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated to be $544,618. The following table summarizes the total investment cost breakdown;

Investment Type	USD
Land Lease	10,461
Building and Civil work	78,947
Machinery and Equipment	137,316
Vehicles	23,684
Office Furniture and Equipment	10,000
Working Capital	284,211
Total Investment Cost	**544,618**

FINANCIAL ANALYSIS

Based on the projected financial statement, the project will generate profit throughout the projected period (10 years). Annual average net profit after tax is projected to be $129,761 with n average margin of 21.1%. The EBITDA margin is expected to be 29.1%. The IRR of the project will be 14.9%, indicating the financial viability of the business.

Revenue	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Milk	486,000	534,600	588,060	646,866	711,553	782,708	860,979	947,077	1,041,784	1,145,963
Cheese	568,421	596,842	626,684	658,018	690,919	725,465	761,739	799,826	839,817	881,808
Butter	34,105	35,811	37,601	39,481	41,455	43,528	45,704	47,990	50,389	52,908
Cream	540,000	567,000	595,350	625,118	656,373	689,192	723,652	759,834	797,826	837,717
Total Revenue	**1,628,526**	**1,734,253**	**1,847,695**	**1,969,483**	**2,100,300**	**2,240,893**	**2,392,073**	**2,554,726**	**2,729,816**	**2,918,396**
Raw Material (Milk)	1,136,842	1,193,684	1,253,368	1,316,037	1,381,839	1,450,931	1,523,477	1,599,651	1,679,634	1,763,615
Packaging	48,856	50,077	51,329	52,612	53,928	55,276	56,658	58,074	59,526	61,014
Total Raw Material Cost	**1,185,698**	**1,243,761**	**1,304,698**	**1,368,649**	**1,435,766**	**1,506,206**	**1,580,135**	**1,657,725**	**1,739,160**	**1,824,629**
Salary	33,474	35,147	36,905	38,750	40,687	42,722	44,858	47,101	49,456	51,929
Office Supplies	1,000	1,025	1,051	1,077	1,104	1,131	1,160	1,189	1,218	1,249
Marketing	2,400	2,520	2,646	2,778	2,917	3,063	3,216	3,377	3,546	3,723
Maintenance (2.5%)	13,365	13,365	13,365	13,365	13,365	13,365	13,365	13,365	13,365	13,365
Utilities	1,053	1,074	1,095	1,117	1,139	1,162	1,185	1,209	1,233	1,258
Fuel & Lubricants	10,263	10,520	10,783	11,052	11,329	11,612	11,902	12,200	12,505	12,817
Total Overhead Cost	**61,555**	**63,651**	**65,845**	**68,140**	**70,542**	**73,056**	**75,687**	**78,441**	**81,324**	**84,341**
EBITDA	**381,273**	**426,840**	**477,153**	**532,694**	**593,992**	**661,631**	**736,251**	**818,560**	**909,333**	**1,009,425**
EBITDA % Revenue	**23.4%**	**24.6%**	**25.8%**	**27.0%**	**28.3%**	**29.5%**	**30.8%**	**32.0%**	**33.3%**	**34.6%**
Depreciation & Amortization	26,021	26,021	26,021	26,021	26,021	26,021	26,021	26,021	26,021	26,021
Total Operating Cost	**407,295**	**452,861**	**503,174**	**558,715**	**620,013**	**687,652**	**762,272**	**844,581**	**935,354**	**1,035,446**
Income Tax	22,188	35,858	50,952	67,614	86,004	106,296	128,682	153,374	180,606	210,634
Net Income	**285,106**	**317,003**	**352,222**	**391,100**	**434,009**	**481,356**	**533,591**	**591,207**	**654,748**	**724,812**
Net Profit Margin	**17.51%**	**18.28%**	**19.06%**	**19.86%**	**20.66%**	**21.48%**	**22.31%**	**23.14%**	**23.99%**	**24.84%**