17. PROFILE ON DAIRY FARM

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I. SUMMARY

This profile envisages the establishment of a dairy farm for the production of 540,000 liters of milk per annum.

The present demand for the proposed product is estimated at 325,000 liters per annum and it is projected to reach 675,000 liters by the year 2019.

The plant will create employment opportunities for 42 persons.

The total investment requirement is estimated at Birr 5.99 million, out of which Birr 2.8 million is required for farm machinery & equipment.

The project is financially viable with an internal rate of return (IRR) of 13% and a net present value (NPV) of Birr 871,710, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Milk is a very important source of nutrient in the diet of Benishangul-Gumuz society. In this society, livestock product is mainly used for family consumption as a supplementary food while little proportion is sold in urban areas. Generally, there is shortage of milk in the market and it is also expensive product in the region. According to IPS Resource Base Assessment report (2003) for Bensihangul-Gumuz, the total number of cows in the region is 63,451. As per similar report, if 40 per cent of them are raised for milk purpose and 60 per cent of this number were giving milk for 230 days of the year and a cow could produce on average 2 liters a day, the total annual milk obtained from the cows is estimated to be 10,004,880 liters. The current milk production situation and the steady increase for the product urges for the establishment of dairy farm in the region.

III. MARKET STUDY AND FARM CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

Ethiopia's Livestock population is among the largest in Africa. Despite large cattle population, the diary industry in Ethiopia has not yet developed. Milk production has remained too low. The annual domestic production, according to some studies, is less than one million tonnes per annum. The extremely perishable nature of fluid milk, in conjunction with the virtual absence of procurement and marketing infrastructure in terms of transport, refrigeration facilities, collection centers and processing plants, have inhabited the commercialization of dairying.

As the country is deficient in milk and milk products, the balance between supply and demand is met by commercial imports and food aid. The data on commercial import of milk is sown in Table 3.1. The average import over the period 2000-2002 was 1,258 tonnes of powdered milk. Thus, there is a high market potential for domestic production to meet the excess demand.

Table 3.1

IMPORT OF POWEDERED MILK (1993-2002)

Year	Imported Powder Milk (Tonnes)
1993	246
1994	225
1995	228
1996	123
1997	564
1998	340
1999	962
2000	1098
2001	1030
2002	11648

Source:- *Customs and Excise Tax Authority, External Trade Statistics, Annual Issues.*

According to the Resource Potential Study conducted by IPS referred herein, in Benishangul-Gumuz livestock products are mainly used for family consumption as supplementary food while a little proportion is sold in urban areas. In general, there is a shortage of milk in the market and is also found to be expensive. The study also estimates the total number of cows in the region to be about 63,000, and the total annual milk yield from cows to be about 10,000,000 litters or 10,000 tonnes.

According to" The 1999/2000 Household Income Consumption and Expenditure Survey" conducted by the Central Statistical Authority(CSA), per capita consumption of milk in Ethiopia is 5.8 kg per year in urban areas, and 4.2 kg in rural areas. This is considerably lower than that of the developing countries and the African average which is 36 kg and 27 kg, respectively. The current (2004) urban population of Benishangul-Gumuz region is estimated to be 56,000. With a per capita (per head) consumption of 5.8kg, present milk demand would be about 325 tonnes per annum .

2. Projected Demand

With increased urbanization and income growth of the population, demand for marketed milk is bound to increase. The future demand for milk is, thus, expected to grow at a rate higher than the urban population growth rate of 4.4%. A growth rate of 5% is, hence, assumed to be reasonable to execute demand projection for milk in the region and the result, as shown in Table 3.2, ranges from 341 tonnes in year 2005 to 675 tonnes by the year 2019.

Table 3.2

DEMAND PROJECTION OF RAW MILK (1994-2019)

Year	Projected Demand (Tonnes)
2004	325
2005	341
2006	358
2007	376
2008	395
2009	415
2010	435
2011	457
2012	480
2013	504
2014	529
2015	556
2016	583
2017	612
2018	643
2019	675

3. Pricing and Distribution

The price of raw milk varies between Birr 2.5 and 2.75 per liter. For the envisaged dairy farm a farm-gate price of Birr 2.5 per liter is recommended. Intra - urban producers mostly sell liquid milk directly to consumers. A small percentage sell to caterers(hotels, bars, etc.), retailers and tinterant traders.

The envisaged farm, however, should use a combination of different options; including such outlets as milk processing plants which produce pasteurized milk, butter, cheese and other dairy products.

B. FARM CAPACITY AND OPERATION PROGRAMME

1. Farm Capacity

Generally, the dairy farm is expected to have about 150 milking cows at 80 per cent calving rate. An average yield per cow is estimated at 15 liters per day. The lactation period for each cow is expected to be 240 days per annum. Based on the above assumptions, the overall daily total milk production is about 2,250 liters/day.

2. Operation Programme

The dairy farm is expected to start with 90 per cent of its full production capacity and grow to 100 per cent in the second year and thenafter.

IV. MATERIALS, INPUTS AND UTILITIES

A. MATERIALS AND INPUTS

The materials and inputs required for the envisaged dairy farm are listed in Table 4.1 Accordingly, stock of dairy heifers, roughage feeds, concentrates, veterinary drugs, veterinary equipment and semen are considered to be the prominent materials and inputs.

Table 4.1
MATERIALS & INPUTS REQUIREMENT AND CORRESPONDING COST

Sr. No.	Description	Unit of Measure	Qty.	Cost (000 Birr)		
				FC	LC	Total
1	Heifers	Pcs	150	-	375.00	375.00
2	Roughage feed	qt	16,000	-	237.50	237.50-
3	Concentrate	qt	86.4	-	86.4	86.4
4	Vaccines and AI service (VS)	-	-	63.6	18.9	82.5
Grand Total		**-**	**-**	**63.6**	**717.8**	**781.4**

B. UTILITIES

The envisaged dairy farm requires utilities such as fuel and lubricant, electricity and water. The total utilities requirement and corresponding cost at full capacity is shown in Table 4.1.

Table 4.2

UTILITIES REQUIREMENT AND COST

Sr. No.	Description	Qty (000)	Cost ('000 Birr)
1.	Electricity (kWh)	18.9	9.00
2.	Water (m^3)	30.24	6.0
3.	Fuel (lt)	30	75.8
4.	Lubricant grew and oil (lt/kg)	3	5.88
Total			**96.68**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

In dairy farm, procurement of heifers with 75 per cent of foreign blood from reliable source is the initial production process. Generally, after procurement of heifers, the dairy farm will have the following process. Heifers feeding with different feeds and treating against diseases and parasites, isolating of diseased heifers, milking, processing of milk and marketing are the main activities of the production process. Feeding includes supplying of roughages and concentrates, while treatment is protection of heifers against contagious disease and internal and external parasites. After milking, the whole milk will be taken from the milking parlor with pipe line to a

cooling tank for temporarily storage and the separation of one per cent fat will be immediately carried out and stored in cold store. Then, the separated cream is either churned to butter or sold as it is depending on the availability of local market. After cream separation, the milk will be filtered and sealed with plastic bags or bottled and distributed to market.

2. Source of Technology

The required machinery and equipment can be supplied by Hagbes PLC, Ries Engineering, etc.

B. ENGINEERING

1. Machinery & Equipment

The machinery and equipment required for the envisaged dairy farm are listed in Table 5.1. The total costs are estimated at Birr 2.50 million, out of which Birr 1.90 million (76.4%) and Birr 0.6 million (23.6%) are required in foreign and local currency, respectively.

Table 5.1

MACHINERY AND EQUIPMENT REQUIREMENT AND COST

Sr. No.	Description	Qty. (No.)	Unit Price (Birr)	Total Costs in 000 Birr		
				LC	FC	Total
1	Tractor 110-125 HP	2	270,000	-	540	540
2	Trailer	4	90,000	180	-	180
3	Disc Plough	2	60,000	-	120	120
4	Disc Harrow	2	90,000	-	180	180
5	Deeping Vat	1	30,000	30	-	30
6	Water pump	3	64,000	-	64	64
7	Generator	1	125,000	-	125	125
8	Water tank ($20m^3$)	1	50,000	50	-	50
9	Tools (set)	1	25,000	-	25	25
10	Workshop equipment	1	100,000	-	100	100
11	Veterinary equipment (set)	1	LS	12.6	62.4	75
12	Bore hall/ water well	1	150,000	150	-	150
13	Milk processing equip	1	LS	170	683	853
13.1	Insulated tank	1	80,000	80	-	80
13.2	External reservoir	1	80,000	80	-	80
13.3	Parallel filters (set)	1	40,000	40	-	40
13.4	Regulator	1	20,000	-	20	20
13.5	Compact plate pasteurize	1	15,000	-	15	15
13.6	Butter mola	4	5,000	-	20	20
13.7	Butter churn	1	12,000	-	12	12
13.8	Spiral air compressor	1	20,000	-	20	20
13.9	Centrifugal pump	1	25,000	-	25	25
13.10	Connecting pipes	1	10,000	10	-	10
13.11	Milking can	24	600	-	14.4	14.4
13.12	Plastic pails	35	20	0.7	-	0.7
	Grand Total			**803.3**	**2825.8**	**2829.1.1**

2. Land, Building and Civil Work

The envisaged dairy farm will have farm buildings and shades for cows and calves. The farm buildings will include stores, offices, workshop, etc. The area required for buildings & shades is 4000 m^2 and pasture and open areas are 450 ha. The total costs of the building and civil works, at the unit cost of Birr 1000 per m^2 for building and Birr 400 per m^2 for shade, is estimated at Birr 0.7 million.

Rural land lease cost in BGRS ranges from Birr 15 to Birr 30 per hectare. Accordingly the total land lease cost, at the rate of Birr 30 per ha for 70 years of land holding, is estimated at Birr 945,000. Thus the total investment on land, building and civil work, assuming that the total land lease cost will be paid in advance is estimated at Birr 1.645 million.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The manpower requirement of the envisaged dairy farm is 42 persons. The list of manpower & corresponding labour cost is shown in Table 6.1. As can be seen from Table 6.1, the total cost of labour is estimated at Birr 231,000.

Table 6.1
MANPOWER REQUIREMENT AND LABOUR COST

Sr. No.	Description	Req. No.	Monthly Salary	Annual salary '000 Birr
1.	Dairy Farm Manager	1	1850	22.2
2.	Secretary & Cashier	1	600	7.2
3.	Accountant	1	700	8.4
4.	Supervisor	1	600	7.2
5.	Milk Processing Technician	4	500	24.00
6.	Barn Workers	16	200	38.4
7.	Tractor Operator	1	500	6.00
8.	Veterinarian	1	850	10.2
9.	Laboratory Tech.	1	400	4.8
10.	Chief Mechanic	1	500	6.00
11.	Driver	1	500	12.00
12.	Ass. Driver	1	200	2.4
13.	Pasture area Worker	9	200	21.6
14.	Cleaner	1	200	2.4
15.	Guard	1	200	9.6
16.	Office Boy	1	200	2.4
	Total	**42**		**184.8**
	Employee's Benefit 25%			42.6
	Grand Total	**42**		**231.0**

B. TRAINING REQUIREMENT

A three weeks on-site training will be necessary for the Manager and the four milk processing technicians of the dairy farm by the machinery supplier during erection & commissioning period. Total cost of the training is expected to be Birr 35 thousand.

VII. FINANCIAL ANALYSIS

The financial analysis of dairy farm project is based on the data provided in the previous chatpers and the following assumptions:-

Construction period	2 years
Source of finance	30% equity
	70% loan
Tax holidays	3 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of Plant machinery and equipment
Accounts receivable	30 days
Raw material (local)	30 days
Raw material (import)	90 days
Work in progress	1 days
Finished products	1 days
Cash at hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total initial investment cost of the project including working capital is estimated at Birr 5.99 million, out of which about 47.6% will be required in foreign currency. Details are indicated in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	945.00	945.00
2	Building and Civil Work	-	700.00	700.00
3	Farm Machinery and Equipment	2,825.8	803.3	2,829.10
4	Office Furniture and Equipment	-	50.00	50.00
5	Pre-operation Expenditure*	-	**636.80**	**636.80**
	Total Investment Cost	**2,825.8**	**2,821.19**	**5,646.99**
6	Working Capital	27.82	319.98	347.80
	Grand Total	**2,853.62**	**3,141.17**	**5,994.79**

B. OPERATION COST

The annual operation cost at full capacity of the farm is estimated at Birr 1.85 million (see Table 7.2). The material and utility cost accounts for 48 per cent while repair and maintenance take 0.89 per cent of the production cost.

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* *Pre-operation expenditure include interest during construction (Birr 636,800), training (Birr 35,000) and cost of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

Table 7.2

ANNUAL PRODUCTION COST ('000 BIRR)

Items	Year			
	3	**4**	**7**	**10**
Farm Material and Inputs	703.26	781.40	781.40	781.40
Labour Direct	138.02	153.36	153.36	153.36
Utilities	87.01	96.68	96.68	96.68
Maintenance and repair	14.11	15.68	15.68	15.68
Labour overheads	57.31	63.90	63.90	63.90
Administration Cost	92.02	102.24	102.24	102.24
Total operating costs	**1091.93**	**1213.26**	**1213.26**	**1213.26**
Depreciation	210.14	210.14	210.14	145.14
Cost of Finance	462.83	434.47	330.28	189.69
Total Production Cost	**1764.90**	**1857.87**	**1753.67**	**1584.08**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the first year of operation. Important ratios such as the percentage of net profit to total sales, net profit to equity (return on equity) and net profit plus interest to total investment (return on total investment) will show an increasing trend throughout the production life of the project.

The income statement and other profitability indicators show that the project is viable.

2. Break-even Analysis

The break-even point of the project is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales-Variable Cost}} = 35\%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project will fully recover the initial investment and working capital within 9 years time.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 13% and the net present value at 10.5% discount rate is Birr 871,710.

D. ECONOMIC BENEFITS

The project can create employment opportunities for 42 persons. In addition to supply of the domestic needs, the project will generate Birr 1.97 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue.