46. PROFILE ON SUGAR CANE FARM

TABLE OF CONTENTS

I. SUMMARY

This profile envisages the establishment of a plant for the production of 225,000 tonnes of Sugar cane per annum.

The present demand for the proposed product is estimated at 2.7 million tonnes and it is projected to reach 5.9 million tonnes by the year 2010.

The plant will create employment opportunities for 41 persons.

The total investment requirement is estimated at Birr 38.34 million, out of which Birr 2.66 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 29% and a net present value (NPV) of Birr 53.49 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Sugar Cane is a tall-growing, tropical perennial grass requiring usually 8-24 months to reach maturity. The plant may grow to a height of 6.1 meters or more. The stems are solid, and have prominent nodes. Leaves are long but most often erect. On a world wide basis, sugar cane supplies the majority of the world's refined sugar. Of the many plants that contain sucrose, sugar cane has been said to excel over all other plants as a converter of the sun's energy and the carbon dioxide of the air into energy, food and fiber.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for sugar cane is directly related with the demand for sugar. Therefore, the demand for sugar cane is estimated by determining first the demand for sugar and that the corresponding demand for sugar cane.

At present, there are three local sugar factories with a total production capacity of 275,000 tonnes. The overwhelming proportion of the country's requirement of sugar is met through domestic production. In order to estimate the household demand for sugar, the 2000/01 " Household Income, Consumption and Expenditure Survey" of CSA is analyzed. Table 3.1 depicts the average quantity of sugar annually consumed by different expenditure groups in the country.

Table 3.1

CONSUMPTION OF SUGAR BY EXPENDITURE GROUP (2000/01)

Expenditure Group	Consumption Per Person (gm)	No. of Persons in the Group	Total Consumption (Tonne)
<600	143	1251249	179
600 – 999	309	1907902	590
1000 – 1399	408	2351416	959
1400 – 1999	798	4545900	3628
2000 – 2599	768	5388520	4138
2600 – 3399	788	7989689	6296
3400 – 4199	1106	7442894	8232
4200 – 5399	1216	8393797	10207
5400 – 6599	1624	5486414	8910
6600 – 8999	2110	6276199	13243
9000 – 12599	2482	3049346	7568
12600 – 16199	3322	906022	3010
16200 – 19999	5596	479185	2682
> 20,000	7037	485706	3418
Grand Total		**55954239**	**164084**

Source :- *Income, Consumption and Expenditure Survey 2000/01 CSA.*

As can be seen from Table 3.1, at the time of the survey the total consumption of sugar was 72,880 tonnes. Taking the total size of the population during the same period (55.95 million), the per capita consumption of sugar is, thus computed to be 1.30 kg. Taking the current population estimate of the nation which is 61,142,708 and applying the per capita consumption estimated above, the current (2004) demand for household consumption is estimated to be 79,637 tonnes.

Sugar is also used as an input by industrial and catering establishments such as producers of soft drink breweries, confectioners, '*tej bets*' and tea rooms. According to a previous study conducted by IPS " Local Sugar Market Study" in 2002, the total demand for sugar by both small scale and large-scale industrial and catering industries were 131,809 tonnes. In estimating the current demand for sugar emanating from the catering and industrial establishments, and 5.83% annual growth which is parallel with the growth rate registered by the industrial sector during 1991-2001 is applied on the 2002 estimate made by the IPS study. Accordingly, the current (2004) demand for sugar by the industrial and catering industries is estimated at 147,625 tonnes.

A substantial amount of sugar is also exported annually. Table 3.2 shows the total volume and value of sugar exported during the past 10 years.

Table 3.2

ANNUAL VOLUME AND VALUE OF SUGAR EXPORT

Year	Volume (Tonnes)	Value ('000 Birr)
1994	15209	25723
1995	10	2209
1996	-	-
1997	13150	4735
1998	-	-
1999	6643	1241
2000	17209	23958
2001	57005	68472
2002	58041	85106
2003	77000	153712

Source :- *National Bank of Ethiopia, annual report*

As can be seen from Table 3.2, export of sugar particularly from the year 1999 onwards has shown a consistent growth reaching a peak figure of 77,000 tonnes in terms of volume and Birr 153.71 million in terms of value. Excluding the years where there was no export, over the years under consideration export has registered an annual average growth rate of 26% and 29% for volume and value, respectively. To estimate the present (2004) export demand for sugar the average volume of export during the most recent five years i.e 43,180 tonnes is assumed to be a fair approximation.

Therefore, the aggregated present demand for sugar which comprise households, industrial and catering and export demand is estimated at 270,442 tonnes per annum. The corresponding demand for sugar cane assuming 10 kgs of sugar cane is required to produce 1 kg of sugar, is estimated at 2.7 million tonnes.

2. Projected Demand

The demand for sugar is influenced by population growth, income, price and consumption habit. After considering the growth patterns of these factories, it is conservatively assumed that the demand for sugar (sugar cane) will grow at an annual growth rate of 5%, (see Table 3.3).

Table 3.3

PROJECTED DEMAND FOR SUGAR CANE ('000 tonnes)

Year	Projected Demand ('000 tonnes)	Existing Production	Demand gap
2005	2840	2700	140
2006	2982	2700	282
2007	3131	2700	431
2008	3287	2700	587
2009	3452	2700	752
2010	3624	2700	924
2011	3805	2700	1105
2012	3996	2700	1296
2013	4195	2700	1495
2014	4405	2700	1705
2015	4625	2700	1925
2016	4857	2700	2157
2017	5100	2700	2400
2018	5355	2700	2655
2019	5622	2700	2922
2020	5903	2700	3203

3. Pricing and Distribution

The recommended farm-gate price for the envisaged project is Birr 135 per tonne. The envisaged farm is recommended to distribute its product directly to sugar cane processing plants.

B. FARM CAPACITY AND PRODUCTION PROGRAMME

1. Farm Capacity

The sugar cane farm will have 1700 ha. of net irrigable land at full capacity, producing 255,000 tonnes of sugar cane.

2. Production Programme

The farm will start production at 50% of its capacity in the first year. Production capacity will then be built upto 61%, 74%, 85%, 97% and 100% in the 2nd , 3rd, 4th, 5th and 6th year respectively. The area and production programme in each year is shown in Table 3.4 below.

Table 3.4

FARM CAPACITY AND PROUDCTION PROGRAMME

Year	Area (ha.)	Production ('000 Tonnes)
2005	850	127.5
2006	1050	157.5
2007	1250	187.5
2008	1450	217.5
2009	1650	247.5
2010	1700	255.0

IV. MATERIALS, INPUTS AND UTILITIES

A. MATERIALS AND INPUTS

The materials and inputs required by the envisaged farm and their corresponding cost estimates in each year are indicated in Table 4.1.

Table 4.1

ANNUAL RAW MATERIAL REQUIREMENT AND COST

AT FULL CAPACITY (IN QUINTALS)

Sr. No.	Description	Qty	Cost '000' Birr		
			FC	LC	Total
1	Fertilizer	7850	2343.9	1,581.1	3925.00
2	Seeds/planting material	25	-	750	750
3	Chemicals	23,376	5640.00	3760.00	9400.00
4.	Slachier	-	-	7.0	7.0
	Grand Total	**-**	**7983.9**	**6098.1**	**14082.00**

B. UTILITIES

Fuel, lubricants, electricity and water, etc are the main utilities required for the production process such as land development, ploughing discing, harrowing, cultivation, and transportation and other activities. Electricity for operating equipment, lighting and domestic use, water for different purposes are also the utilities required by the farm.

The total utilities cost required for running the project is estimated to be Birr 1.67 million (see Table 4.2).

Table 4.2

UTILITIES REQUIREMENTS AND COSTS

Sr. No.	Description	Cost '000' Birr
1	Electricity and water	390
2	Fuel	1164
3	Lubricant grease oil	116.4
	Grand Total	**1670.4**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

a) Land Development

The main process of sugar cane farm will start with land surveying, land clearing, leveling and irrigation land construction.

b) Land Preparation, Planting and Fertilization

The actual land preparation is started by ploughing and followed by discing and harrowing in order to get fine seedbed. Fine seedbed preparation is followed by planting of vegetative stem pieces and fertilizer application. Both operations are expected to be conducted by manual labour.

c) Pre-harvest Management

The sugar cane production, cultivation for weed control and soil fertility improvement, insect and disease control, fertilization and irrigation water application are the predominant agricultural operations. Tractor mounted sprayer will be used to spray chemicals for insect pests, disease and weed controls. Fertilization will be carried out manually.

d) Post-harvest Management

The sugar cane harvesting is the initial stage of post harvest management which includes standing cane firing to burn off leaves, cutting stalks, topping and loading. The operations will be undertaken by hand.

2. Source of Technology

The machinery and equipment required for the sugar cane farm can be supplied by Ries Engineering or Tetraco Plcs. etc.

B. ENGINEERING

1. Machinery and Equipment

The total cost of machinery and equipment required is estimated to be Birr 2.66 million, out of which Birr 2.12 million is required in foreign currency. The list of machinery and equipment and corresponding costs are shown in Table 5.1.

Table 5.1
MACHINERY AND EQUIPMENT
REQUIREMENT AND COST

Sr. No.	Description	Qty	Cost '000' Birr		
			LC	FC	Total
1	Tractor1 10-12549	3	-	810	810
2	Disc plough	3	-	180	180
3	Disc Harrow	3	-	270	270
4.	Ridger	3	-	120	120
5	Tractor mounted sprayer	3	-	75	75
6	Cultivator	3	-	75	75
7	Generator	1	-	155	155
8	Trailor	6	540	-	540
9	Work shop equipment	Set	-	50	50
10	Tools	Set	-	12.5	12.5
	Grand Total		**540**	**2122.5**	**2662.5**

2. Land, Building and Civil Works

The total area for sugar cane farm including open area, staff canteen, etc. is estimated to be 2,400 ha. Building area of the farm which includes stores, offices and workshops is estimated to be 7000 m^2. The total cost of building at an average unit cost of Birr 700 per m^2 is estimated at Birr 4.9 million.

Land development for 1700 ha of irrigated land including irrigation infrastructure, access road construction is estimated to cost about Birr 11.3 million.

Total land lease cost for a period of 70 years and at the rate of Birr 50 per hactar is estimated at Birr 8.4million.

3. Proposed Location

The location should be near major rivers like Beles in Metekel zone, which has the capacity to irrigate large area of land.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The permanent workers and causal labour required by the farm and corresponding labour costs are presented in Table 6.1.

B. TRAINING REQUIREMENT

No special training is required for the envisaged sugar cane farm.

Table 6.1

MANPOWER REQUIREMENT AND LABOUR COSTS (BIRR)

Sr. No.	Job Title	Req. No.	Monthly Salary	Annual Salary
1	General manager	1	2250	27,000
2	Secretary/cashier	1	700	8,400
3	Agronomist	1	2000	24,000
4	Plant protection inspector	1	1500	18,000
5	Irrigation agronomist	2	2000	24,000
6	Production supervisors	2	500	12,000
7	Accountant	1	800	9,600
8	Purchaser	1	700	8,400
9	Sales man	1	700	8,400
10	Tractor operator	6	500	36,000
11	Ass. tractor operator	6	300	21,600
12	Chief mechanic	1	700	8,400
13	Ass. mechanic	1	500	12,000
14	Generator operator	1	300	3600
15	Driver	3	500	18,000
16	Asst. Driver	2	300	7,200
17	Store man	1	300	3,600
18	Office boy	1	200	2,400
19	Guard	8	200	19,200
20	Janitor	2	200	4,800
	Sub-Total	**41**	**-**	**281,400**
	Employee benefit (25%)	-	-	70,350
	Grand Total	**41**	**-**	**351,750**
	Casual labour			661,180

VII. FINANCIAL ANALYSIS

The financial analysis of sugar cane project is based on the data provided in the previous chapters and the following assumptions:-

Construction period	2 years
Source of finance	30 % equity
	70 % loan
Tax holidays	4 years
Bank interest	10.5%
Discounted cash flow	10.5%
Land value	Based on estimated land lease cost
Repair and maintenance	5 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	30 days
Raw materials, import	90 days
Work in progress	90 days
Finished products	30 days
Cash in 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 38.35 million, out of which about 11% 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	-	8,400.00	8,400.00
2.	Building and Civil Work	-	16,200.00	16,200.00
3.	Machinery and Equipment	540.00	2,122.5	2,662.5
4.	Office Furniture and Equipment	-	150.00	150.00
5.	Vehicle	-	750.00	750.00
6.	Pre-production Expenditure*	-	4,530.44	4,530.44
	Total Investment cost	**540.00**	**32,152.90**	**32,692.91**
7	Working Capital	3562.81	2092.45	5,655.26
	Grand Total	**4102.85**	**34,245.35**	**38,348.20**

B. PRODUCTION COST

The annual production cost at full operation capacity of the farm is estimated at Birr 19.59 million (see Table 7.2). The material and utility cost accounts for 78 per cent while repair and maintenance take 0.66 per cent of the production cost.

---

* *Pre-production expenditure include interest during construction (Birr 4.38 million) and costs 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
Raw Material and Inputs	7,041.00	8,590.02	13,659.54	14,081.97
Labour direct	84.42	102.99	163.77	168.84
Utilities	835.20	1,018.94	1,620.29	1,670.40
Casual labour	330.59	403.32	641.34	661.18
Maintenance and repair	66.56	81.21	129.13	133.12
Labour overheads	35.18	42.91	68.24	70.35
Administration Overheads	56.28	68.66	109.18	112.56
Total Operating Costs	**8,449.23**	**10,308.06**	**16,391.51**	**16,898.42**
Depreciation	1,391.25	1,391.25	1,391.25	1,211.25
Cost of Finance	2,540.91	2,385.27	1,813.21	1,041.38
Total Production Cost	**12,381.39**	**14,084.57**	**19,595.97**	**19,151.06**

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.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 26\ \%$$

3. Pay-Back Period

The investment cost and income statement projection are used to project the pay-back period. The project's initial investment will be fully recovered within 5 years.

4. Internal Rate of Return and Net Present Value

Based on the cashflow statement, the calculated IRR of the project is 29 % and the net present value at 10.5% discount rate is Birr 53.49 million.

D. ECONOMIC BENEFITS

The project can create employment for 41 persons. In addition to supply of the domestic needs, the project will generate Birr 51.95 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such a farm will have a foreign exchange earning effect to the country by enhancing the sugar export volume.