28. PROFILE ON SPICE PROCESSING AND PACKING

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I. SUMMARY

This profile envisages the establishment of a plant for the production of 300 tonnes of spices per annum.

The current demand for the proposed product is estimated at 500,000 tonnes per annum and it is projected to reach 655,825 tonnes by the year 2010.

The project will create employment opportunity for 24 persons.

The total investment cost of the project is estimated at Birr 15.71 million, out of which Birr 7.4 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 19% and a net present value (NPV) of Birr 7.88 million, discounted at 10.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Spice is an aromatic or pungent plant product used in cookery to season and flavour food. Spices commonly used in cooking and pastry are; pepper, mustard, cinnamon, nutmeg, mace, all spice, ginger and cloves. Spices are processed and delivered either in powder form or all concentrates.

Standard sizes for powder products are 20 mg, 50 mg and 100 mg. The concentrates are delivered either in 240 mg or 500 mg bottle or 1 kg glass container.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKTE STUDY

1. Past Supply and Present Demand

Spices are aromatic flavourings made from certain plants. The term spice is usually applied to pungent plant products. Among spices pepper is the world most important spice prepared from the fruit of pepper corns.

The United States imports more pepper than any other country covering one fourth of annual world imports. Major sources for pepper include; Indonesia, India, Brazil, Malaysia, Thailand, Srilanka and Mexico.

Until recently, there was only one spice extraction factory in Ethiopia; namely, Ethiopian Spice Extraction Factory, turned to a share company now. The factory has an annual capacity of producing 764 tonnes of ginger, capsicum oleoresin and turmeric.

In Ethiopia, the red pepper is an important additive to Ethiopian meals. Therefore, the domestic market is the major consumer of pepper. However, the country also export spice, during the period 1999-2002 on average 299 tonnes of spices were exported (see Tabel 3.1)

Table 3.1

EXPORTED SPICE (Tonnes)

Year	Exported Spice
1999	393
2000	144
2001	396
2002	261
Average	**299**

The current global market on the other hand is estimated at 500,000 tonnes of spices. India plays the major role by supplying 50% of spices and herb to the world market. For the last three years India supplied an average 251,000 tonnes annually, with an average annual growth rate of 2.75%.

2. Projected Demand

As an export product, the demand for spice is dependent on the international market. The international market led by India which has shown 2.75% growth rate is assumed to grow at the same rate in the future. Thus, the demand for spice is expected to reach 655,825 tonnes by the year 2014 (see Table 3.2).

Table 3.2

PROJECTED DEMAND FOR SPICES

Year	Demand (Tonnes)
2005	513,700
2006	527,878
2007	542,395
2008	557,311
2009	572,637
2010	588,384
2011	604,565
2012	621,190
2013	638,273
2014	655,825

3. Pricing And Distribution

The latest international prices for different spices are given in Table 3.3.

Table 3.3

INTERNATIONAL PRICE FOR SPICES

Products	**Price** (Tonnes)	
	US Dollar	**Birr**
Caroamom	9,922	86,820
Chilles	1,411	12,350
Ginger	4,410	38,590
Turmeric	1,213	10,610
Garlic	1,125	98,440
Cumin	1,940	104,480

Source:- External Trade Statistics, CSA

For the purpose of financial analyses, the average price, i.e., Birr 58.54 per kg is adopted. The product can be directly exported.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The annual production capacity of the plant is scheduled to be 300 tonnes. The product mix for the various spices, both in powder form and as concentrates is as indicated in Table 3.4. The production capacity is based on 3 shifts of 8 hours a day and 250 working days a year. Seven weeks per annum are reserved for annual maintenance. The production programme does not include Sundays and public holidays.

Table 3.4

PRODUCT MIX (IN TONNES)

Product	Annual Production Schedule		
	Powder	**Concentrate**	**Total**
Pepper	-	150	150
Cinnamon	10	-	10
Mustard	10	20	30
Nutmeg	-	20	20
Turmeric	25	5	30
All Spice	-	10	10
Ginger	10	20	30
Cloves	20	-	20
Grand Total	**75**	**225**	**300**

2. Production Programme

The production programme and capacity utilization for the processing of 300 tonnes of different types of spices is as indicated in Table 3.5. The plant, during the first year will process 70% of its rated capacity. During the second and third years, it will produce 75% and 100% of its capacity, respectively. Capacity build-up is set considering the time required for training of operators, machine teething and adjustments.

Table 3.5

ANNUAL PRODUCTION PROGRAMME

Sr. No.	**Description**	**Year 1**	**Year 2**	**Year 3 and onwards**
1	Production, tonne	210	225	300
2	Capacity utilization rate, %	70	75	100

IV. MATERIALS AND INPUTS

A. RAW AND AUXILIARY MATERIALS

The annual requirement of raw and auxiliary materials by the envisaged plant is as indicated in Table 4.1.

Table 4.1

RAW AND AUXILIARY MATERIALS REQUIREMENT AND COST

Material	Qty. (Tonnes)	Unit Cost (Birr)	Total ('000 Birr)
Pepper	210	15,000	3,150
Cinnamon	12	70,000	840
Mustard	38	8,000	304
Nutmeg	25	16,000	400
Turmeric	36	6,000	216
All spice	12	25,000	300
Ginger	60	15,000	900
Cloves	30	70,000	2,100
Oil rebin	200	18,000	3,600
Packaging	150,000pcs	10	1,500
Grand Total			**13,310**

B. UTILITIES

The annual utilities requirement of the plant is given in Table 4.2.

Table 4.2

ANNUAL UTILITIES REQUIREMENT AND COST

Utility	Unit of Measure	Unit Cost	Total, Birr
Electricity	120,000 kWh	0.473 Birr/kWh	56,760
Water	360m^3	2 Birr/m^3	720
Grand Total	-	-	**57,480**

V. TECHNOLOGY AND ENGINEERING

A. TECHNOLOGY

1. Production Process

Powder spices are processed by cleaning, drying and grinding. Concentrated spices are processed by extraction. The spice is first dried before it is cut to pieces of a considerable size and then ground. It is, further, separated by a cyclone whereby the fine particles are shelled and cleaned. Thereafter, the powder is further extracted and then dissolved in oil resin. Finally, it is cooled in a plate cooler to keep the concentration to a desired value. It is, then, inspected and packed in glass jars before it is delivered. Powder products are packed using paper bags.

2. Source of Technology

The following company could supply the required machinery and technology:-

Mohendra Technical Industries Pvt. Ltd.
Chilarsli Pathi, India
Fax: + (91) - (361) - 2303495.

B. ENGINEERING

1. Machinery and Equipment

The principal process machinery are as indicated in Table 5.1. The total cost of machinery and equipment is estimated at Birr 7,400,432, out of which Birr 6,290,367 will be required in foreign currency.

Table 5.1

MACHINERY AND EQUIPMENT

Sr. No.	Machinery	Qty. (pcs)
1.	Drier	1
2.	Cutter	1
3.	Grinder	1
4.	Cyclone	1
5.	Shaker	1
6.	Seed Cleaner	1
7.	Extractor	3
8.	Dissolventizer	3
9.	Plate Cooler	2
10.	Condenser	2
11.	Vacuum Boiler	2
12.	Compressor	2

2. Land, Building and Civil Works

The total area of land required for the envisaged plant is about 2,000 m^2. The total built-up area will be 1,400 m^2. The cost of buildings and civil works, at the rate of Birr 1,300 per m^2, is estimated at Birr 1,820,000. The total cost of land lease cost, at the rate of Birr 2.5 per m^2 and for a period of 70 years, is estimated at Birr 350,000. The total land lease cost is assumed to be paid in advance.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The manpower requirement for the envisaged project is 24 persons and the corresponding annual labour cost is estimated to be 258,000. The details are indicated in Table 6.1.

Table 6.1

MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No.	Description	No. of Persons	Monthly Salary (Birr)	Annual Salary (Birr)
1.	Plant Manager	1	2,000	24,000
2.	Technologist	1	1,800	21,600
3.	Engineer	1	1,800	21,600
4.	Cashier	1	900	10,800
5.	Mechanics	4	3,000	36,000
6.	Operators	9	5,400	64,800
8.	Clerks	3	1,350	16,200
9.	Guards	3	450	5,400
10.	Driver	1	500	6,000
	Sub -Total	**24**		**206,400**
11	Employees' Benefit (20%)			51,600
	Grand Total	**24**		**258,000**

B. TRAINING REQUIREMENT

Nine operators and four mechanics should be given a one week on-the -job training on spice processing technology and equipment operation in the Spice Processing Plant located in Addis Ababa. The training cost is estimated at Birr 39,000 which will totally be required in local currency.

VII. FINANCIAL ANALYSIS

The financial analysis of the spice processing & packing project is based on the data presented in the previous chapters and the following assumptions:-

Construction period	2 years
Source of finance	30 % equity
	70 % loan
Tax holidays	6 years
Bank interest	10.5%
Discounted cash flow	10.5%
Repair and maintenance	5 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	90 days
Work in progress	5 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 14.52 million, of which 40% will be required in foreign currency. The breakdown of the total initial investment cost is shown in Table 7.1

Table 7.1

INITIAL INVESTMENT COST ('000 BIRR)

Sr. No.	Cost Items	Foreign Currency	Local Currency	Total
1	Land	-	350.00	350.00
2.	Building and Civil Work	-	1,820.00	1,820.00
3.	Plant Machinery and Equipment	6,290.37	1,110.06	7,400.43
4.	Office Furniture and Equipment	-	100.00	100.00
5.	Vehicle	-	250.00	250.00
6.	Pre-production Expenditure *	-	1,673.43	1,673.43
	Total Investment cost	**6,290.37**	**5,303.49**	**11,593.86**
7	Working Capital	-	4,112.60	4,112.60
	Grand Total	**6,290.37**	**9,416.1**	**15,706.47**

B. PRODUCTION COST

The annual production cost at full operation capacity of the plant is estimated at Birr 15.56 million (see Table 7.2). The material and utility cost accounts for 86 per cent while repair and maintenance take 2.39 per cent of the production cost.

** Pre-production expenditure include interest during construction (Birr 1.55 million), training (Birr 39,000), 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	9,335.50	9,978.8	13,310.0	13,310.0
Labour direct	86.9	92.9	123.8	123.8
Utilities	40.3	43.1	57.5	57.5
Maintenance and repair	259.5	277.4	370.0	370.0
Labour overheads	36.2	38.7	51.6	51.6
Administration cost	57.9	61.9	82.7	82.7
Total Operating Costs	**9,816.3**	**10,492.7**	**13,995.5**	**13,995.5**
Depreciation	920.0	920.0	920.0	846.0
Cost of Finance	901.1	845.9	643.0	369.3
Total Production Cost	**11,637.4**	**12,258.7**	**15,558.6**	**15,210.9**

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 profit to total sales, net profit to equity (Return on equity) and net profit plus interest on total investment (return on total investment) show an increasing trend during the life-time of the project. The income statement and the other indicators of profitability 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 and working capital will be fully recovered within 6 years.

4. Internal Rate of Return and Net Present Value

Based on the cash flow statement, the calculated IRR of the project is 19 % and the net present value at 10.5% discount rate is Birr 7.88 million.

D. ECONOMIC BENEFITS

The project can create employment for 24 persons. In addition to supply of the domestic needs, the project will generate Birr 8.12 million in terms of tax revenue. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange earning effect to the country by exporting its product.