

**162. PROFILE ON CARDAMOM PROCESSING
AND PACKING**

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I. SUMMARY

This profile envisages the establishment of a plant for the processing of cardamom with a capacity of 150 tonnes per annum.

The present demand for the proposed product is estimated at 516 tonnes per annum. The demand is expected to reach at 1,426 tonnes by the year 2022.

The plant will create employment opportunities for 18 persons.

The total investment requirement is estimated at Birr 2.62 million, out of which Birr 1.22 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 1.04 million discounted at 8.5%.

II. PRODUCT DESCRIPTION AND APPLICATION

Cardamom seeds whole or in powdered form are regarded as one of the most valuable spices, often employed in the preparation of curry powder, pickles, sausages, cakes and confectionery.

The cardamom fruit is a creamy-white, oblong-avoid, shortly beaked, three-sided capsule with a fibrous, papery and longitudinally wrinkled periapt. The seeds in each oculus are pressed together, usually separating in a single mass.

The cardamom seeds have a pleasant aroma and a characterstic warm, slightly pungent taste. The pleasant aroma of cardamom is due to the presence of a volatile oil (3-8%) contained in the seeds.

The powdered seed is also used for flavouring coffee, liquers and tobacco. In pharmaceutical production cardamom is used as stimulant, stomachic, carminative, diuretic and as flavouring agent for syrups.

III. MARKET STUDY AND PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The country's requirement for cardamom has been met through domestic production and imports. However, data on domestic production and imports of the product is not readily available. Therefore, the Revised Report on the 1995/96 Household Income, Consumption and Expenditure Survey is analyzed in estimating the domestic demand for cardamom. Table 3.1 depicts the average amount of cardamom consumed by different expenditure groups in urban and rural areas according to the survey finding.

Table 3.1
DOMESTIC CONSUMPTION OF CARDAMOMS

Income Group Number of	Individuals in the Group Average Annual	Consumption (gram) Total Annual	Consumption (kg)
< 600	17,253	-	-
600 - 999	125,904	1	126
1000-1399	432,547	2	865
1400-1999	580,104	2	1,160
2000-2599	4,217,465	4	16,870
2600-3399	6,498,555	10	64,986
3400-4199	7,844,772	9	70,603
4200-5399	10,885,614	10	108,856
5400-6599	8,007,978	33	264,263
6600-8999	8,817,091	23	202,793
9000-12599	5,114,961	13	66,494
12600-16199	1,765,555	29	51,201
16200-19999	673,706	16	10,779
> 20000	972,722	23	22,373
Total	55,954,227		881,370

Source: CSA, Revised Report on the 1995/96 Household Income Consumption and Expenditure Survey, 2001.

As can be seen from Table 3.1, the total consumption requirement of households for cardamom is 881370 kg per annum. Given a total population of 55,954,227 at the time the survey was conducted, the per capita consumption of cardamom is computed to be 0.02 kg. Using the total population for 2007, the current domestic demand of households for cardamom is estimated at 1542.54 tonnes. According to retailers in the business, the domestic supply of cardamom is at least twice the imported one. Thus, the market share of the envisaged plant from the estimated current domestic demand for the product will be 514.18 tonnes.

Although much of the domestic production is meant for domestic consumption, the country also exports cardamom. The amount of cardamom exported during 1997-2006 is depicted in Table 3.2. Exports of cardamom varied from a minimum of 6.98 tonnes in 2001 to a maximum of 46.11 tonnes in 2002 and averaged 25.56 tonnes during the period under reference.

Table 3.2
EXPORTS OF CARDAMOM (TONNES)

Year	Exports
1997	27.87
1998	11.07
1999	18.43
2000	8.85
2001	6.98
2002	46.11
2003	71.80
2004	21.24
2005	26.53
2006	16.70
Average	25.56

Source: Customs Authority, External Trade Statistics, 1997-2006.

Given the considerable fluctuations in the volume of exports of the product, the average annual export during the period under reference is considered as the effective export demand for cardamom for the year 2006. Taking into account the remarkable growth in exports, a rate of growth of 7% is adopted in estimating the export demand for the product. The present export demand for the product (i.e., for 2007) is therefore estimated at 27.35 tonnes. Given the flourishing export sector, the envisaged plant is expected to achieve a volume of export equivalent to 10% of the estimated current export demand for the product, i.e. 2.74 tonnes. Thus, out of the 1569.89 tonnes total present demand (domestic consumption + export) for the product, the total market share (domestic consumption + export) of the envisaged plant is estimated at 516.92 tonnes.

2. Projected Demand

As stated above, a growth rate of 7% is considered in projecting both the domestic and export demand for cardamom. The projected demand for the product is shown in Table 3.3.

Table 3.3**PROJECTED DEMAND FOR CARDAMOMS (TONNES)**

Year	Projected Demand
2007	516.92
2008	553.10
2009	591.82
2010	633.25
2011	677.58
2012	725.01
2013	775.76
2014	830.06
2015	888.16
2016	950.34
2017	1,016.86
2018	1,088.04
2019	1,164.20
2020	1,245.70
2021	1,332.90
2022	1,426.20

3. Pricing and Distribution

Based on the CIF price of the external trade statistics for 2006 (the latest data available), and allowing 40% for import duty and other clearing expenses, the factory gate price for the envisaged plant is estimated at Birr 20,000 per tonne.

The envisaged plant can use the existing wholesale and retail network to distribute its product.

B. PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Plant Capacity

The annual production capacity of the envisaged project is 150 tonnes of cardamom seed powder, based on 300 working days per annum and single shift (8 hrs) per day.

2. Production Programme

At the initial stage of the production period, the plant requires some years to penetrate into the market. Therefore, in the first and second year of production, the capacity utilization rate will be 70% and 90%, respectively. In the third year and thereafter, full capacity production shall be attained. The production program is indicated in Table 3.4.

Table 3.4
PRODUCTION PROGRAMME

Sr. No.	Description	Production Year		
		1	2	3-10
1	Cardamom seed powder (tonne)	105	135	150
2	Capacity utilization rate (%)	70	90	100

IV. MATERIAL AND INPUT

A. RAW AND AUXILIARY MATERIAL

The annual raw and auxiliary material requirement and cost is indicated in Table 4.1. The total cost of raw material per annum is estimated at Birr 1,837,500.

Table 4.1**ANNUAL RAW AND AUXILIARY MATERIAL REQUIREMENT AND COST**

Sr. No.	Raw Material	Unit	Qty	Cost ('000 Birr)
1	Cardamom fruit	tonne	225	1,575
2	Packing materials	kg	7500	262.5
	Total			1,837.5

B. UTILITIES

Electricity and water are major utilities of the project. The annual utility requirement and cost is shown in Table 4.2.

Table 4.2**UTILITIES REQUIREMENT & COST**

Sr. No.	Utility	Unit	Qty	Cost ('000 Birr)
1	Electricity	kWh	150,000	71.1
2	Water	m ³	1,000	10
	Total			181.1

V. TECHNOLOGY AND ENGINEERING**A. TECHNOLOGY****1. Process Description**

The cardamom fruit first enters the decorticating machine in which the outer mantel husk, is crushed to release the seed. The husk and the seed shall be separated by the vibratory

screen machine which is followed by powdering in disintegrator and micropulveriser. The powder is then packed in automatic packing machine in pillow type bags.

2. Source of Technology

The following Chinese company may supply the complete set of machinery and equipment.

China Machinery & Equipment (CMEC)

No. 178, Guanganmenwai Street, Xuanwu District, Beijing

Tel. (86-10) 63451188

Fax: (86-10) 63261865

B. ENGINEERING

1. Machinery and Equipment

Table 5.1 indicates the list of machinery and equipment. The total cost of machinery is estimated at Birr 1,220,000 of which Birr 1,016,700 is required in foreign currency.

Table 5.1
LIST OF MACHINERY EQUIPMENT

Sr. No.	Description	Qty
1	Decorticator	1
2	Vibratory screen	1
3	Disintegrator	1
4	Micropulverizer	1
5	Sifting machine	1
6	Weighting and packing	Unit
7	Miscellaneous equipments	set

2. Land, Building and Civil Work

The total land required by the project is about 1000 m² out of which the built-up area is 300 m². The cost of building is thus estimated at Birr 450,000. The lease value of land is Birr 80,000 at a rate of 1 Birr /m² per annum for 80 years.

3. Location and Site

Sheka, Kaffa and Bench Maji zones are potential areas of cardamom growers. Specially, in Menjowo woreda, Adikaka town is the best location to establish the project for its proximity to raw material sources.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPOWER REQUIREMENT

The envisaged project requires 18 employees. The list of manpower and labour cost is indicated in Table 6.1. The total annual labour cost is estimated at Birr 238,500.

Table 6.1
MANPOWER REQUIREMENT AND COST

Sr. No.	Manpower	Req. No.	Monthly Salary (Birr)	Annual Salary (Birr)
1	General manager	1	3,000	36,000
2	Secretary	1	700	8,400
3	Marketing and sales officer	1	1,500	18,000
4	Accountant	1	2,000	24,000
5	Production head	1	2,000	24,000
6	Operators	4	2,800	33,600
7	Daily labourers	6	1,800	21,600
8	Mechanic	1	1,500	18,000
9	Guards	1	600	7,200
	Sub-total	18	15,900	190,800
	Benefit (25% of BS)		3,975	47,700
	Total		19,875	238,500

B. TRAINING REQUIREMENT

On-the-job training shall be carried out during plant erection and commissioning by the experts of machinery suppliers. The training cost is estimated at Birr 20,000.

VII. FINANCIAL ANALYSIS

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

Construction period	1 year
Source of finance	30 % equity 70 % loan
Tax holidays	5 years
Bank interest	8%
Discount cash flow	8.5%
Accounts receivable	30 days
Raw material local	30 days
Work in progress	2 days
Finished products	30 days
Cash in hand	5 days
Accounts payable	30 days

A. TOTAL INITIAL INVESTMENT COST

The total investment cost of the project including working capital is estimated at Birr 2.62 million, of which 33 per cent will be required in foreign currency.

The major breakdown of the total initial investment cost is shown in Table 7.1.

Table 7.1
INITIAL INVESTMENT COST

Sr. No.	Cost Items	Total Cost (‘000 Birr)
1	Land lease value	80.0
2	Building and Civil Work	450.0
3	Plant Machinery and Equipment	1,220.0
4	Office Furniture and Equipment	100.0
5	Vehicle	200.0
6	Pre-production Expenditure*	290.4
7	Working Capital	288.4
	Total Investment cost	2,628.7
	Foreign Share	33

* *N.B Pre-production expenditure includes interest during construction (Birr 140.37 thousand) training (Birr 20 thousand) and Birr 130 thousand costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. PRODUCTION COST

The annual production cost at full operation capacity is estimated at Birr 2.65 million (see Table 7.2). The material and utility cost accounts for 76.06 per cent, while repair and maintenance take 2.64 per cent of the production cost.

Table 7.2**ANNUAL PRODUCTION COST AT FULL CAPACITY ('000 BIRR)**

Items	Cost	%
Raw Material and Inputs	1,837.50	69.23
Utilities	181.1	6.82
Maintenance and repair	70	2.64
Labour direct	114.48	4.31
Factory overheads	38.16	1.44
Administration Costs	76.32	2.88
Total Operating Costs	2,317.56	87.32
Depreciation	224.5	8.46
Cost of Finance	111.98	4.22
Total Production Cost	2,654.04	100

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 including cost of finance when it starts to operate at full capacity (year 3) is estimated by using income statement projection.

$$\text{BE} = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable Cost}} = 56 \%$$

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 cash flow statement, the calculated IRR of the project is 19% and the net present value at 8.5% discount rate is Birr 1.04 million.

D. ECONOMIC BENEFITS

The project can create employment for 18 persons. In addition to supply of the domestic needs, the project will generate Birr 949,090 million in terms of tax revenue.