AVOCADO FARM AND PROCESSING PLANT

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I. SUMMARY

This profile envisages the establishment of Avocado farm & processing plant with a farm capacity of 1,500 tonnes per annum and a processing capacity of 150 tonnes per annum.

The present demand for processed avocado is estimated at 4,552 tonnes per annum. The demand is expected to reach at 8,641 tonnes by the year 2015.

The farm & plant will create employment opportunities for 19 persons.

The total investment requirement is estimated at Birr 6.71 million, out of which Birr 4.4 million is required for plant and machinery.

The project is financially viable with an internal rate of return (IRR) of 13% and a net present value (NPV) of Birr 2.29 million, discounted at 8.5 %.

II. FARM & PRODUCT DESCRIPTION

Avocado is a staple food and native to tropical America and extend to far Asia, Cuba, etc. It has a high nutritional value, rich in fats and proteins.

Avocado has twice as much energy value as in bananas. In addition, vitamins A,B,C and E are also found in it. The fresh smooth buttery pulp is eaten and it is the most nutritious of all fruits. It is usually served as half fruits with lemon juice, vinegar, salt and pepper. It is used in salads. The pulp, which may be preserved by freezing, is used as a sandwich filling or spread and in ice creams and milk shakes. Avocado oil is used in cosmetic.

III. MARKET STUDY, FARM AND PROCESSING PLANT CAPACITY

A. MARKET STUDY

1. Past Supply and Present Demand

The demand for avocado in the country is mainly met through local production. The country also exports fresh avocado mainly to Djibouti and Yemen. However, the annual average quantity exported to these countries in the past five years does not exceed one tonne.

On the other hand, the country imports a variety of canned fruits from abroad. Nevertheless, the quantity of canned avocado imported to the country could not be known due to problem of data aggregation.

In order to estimate the supply and demand for avocado, the report on the 1999/2000 Houshold Income, Consumption and Expenditure Survey conducted by CSA and

published in February 2001 is used as a base. Domestic consumption of avocado by income group is given in Table 3.1.

Table 3.1
DOMESTIC CONSUMPTION OF AVOCADO BY INCOME GROUP

Income Group	No. of H.H in the Group	Annual per HH Consumption (Gramme)	Total Annual Consumption (Tonne)
<600	14660	-	-
600-999	88154	-	-
1000-1399	213080	10	2.13
1400-1999	593,706	15	8.91
2000-2599	955,547	126	120.40
2600-3399	1,641,949	177	290.63
3400-4199	1,731,550	144	249.34
4200-5399	2,141,178	201	430.38
5400-6599	1,423,499	397	962.13
6600-8999	1,430,130	506	723.65
9000-12599	750,268	743	557.45
12600-16199	244,782	816	199.74
162000-19999	95,567	537	51.32
>20000	140615	414	58.21
Total	**11,464,685**		**3,654.29**

A glance at Table 3.1 reveals that major consumers of avocado appear to be the high and middle income households. The data also show that the per capita annual consumption per household is about 0.32 kg. Hence, taking the current (year 2004) number of households which is 14.226 million, the present demand is estimated at 4,552 tonnes. Consumption of processed avocado in the country is found to be low. Therefore of the total present demand 90% (4097 tonnes) is assumed to be in a fresh fruit and the remaining 10% (455 tonnes) in a processed form.

2. Projected Demand

The consumption of avocado is influenced, among other things, by income, urbanization and consumption habit of the population. As mentioned earlier, major consumers of the product are the high and middle income group of population. In addition to the domestic market there is also a potential export market in neighbouring countries. Taking the above factors into account demand is estimated to grow by 6% per annum. The projected demand is shown Table 3.2.

Table 3.2
PROJECTED DEMAND FOR AVOCADO

Year	Projected Demand (Tonnes)
2004	4552
2005	4825
2006	5115
2007	5422
2008	5747
2009	6092
2010	6457
2011	6844
2012	7255
2013	7690
2014	8152
2015	8641

Of the total projected demand, the market share of the envisaged project is estimated to range from 20% to 25%. Hence, taking the projected demand of year 2010, a farm that can produce from 1,200 to 1,500 tonnes is recommended of the total farm produce 90% is the share of fresh fruit while the remaining 10% will be processed.

3. Pricing and Distribution

The project will supply fresh and processed avocado to the market. Accordingly, the price for fresh and processed avocado is set at Birr 1/kg and Birr 4/kg, respectively.

The product can get its market outlet through the existing whole sale fruits and vegetables enterprises as well as department stores and supermarkets.

B. FARM SIZE, PLANT CAPACITY AND PRODUCTION PROGRAMME

1. Farm Size & Plant Capacity

The total area to be cultivated under avocado will be 50 ha. at its full capacity. About 1,500 tonnes of fresh fruit will be produced from the farm annually. The processing plant will have a production capacity of 150 tonnes of processed avocado utilizing 10% of the fresh fruit produced. The remaining 1,350 tonnes of fresh fruit will be sold in the local market.

2. Production Programme

The avocado farm reach fruition after one year from plantation. Considering the problem in skill development and market penetation, the avocado farm is designed to begin with 50% capacity in the first year production season and will reach full capacity in the second year. The processing plant starts operation at 75% of the rated capacity in the first year (on the same year of fruition) and shall progressively grow to 85% in the second year, 90% in the third year reaching full (100%) capacity in the fourth year and there after. The processing plant will have 300 working days, operating in single shift of 8 hours a day.

IV. FARM & PLANT MATERIALS, INPUTS AND UTILITIES

A. FARM & PLANT MATERIALS AND INPUTS

The main raw materials and inputs required for the avocado farm and processing plant are fertilizers, chemicals, preservatives, seedlings and packing materials. Most of the raw materials can be obtained from the local agents. The detailed raw materials requirement and cost is shown in Table 4.1 below. The total annual cost of raw materials and inputs is estimated at Birr 508,000.

Table 4.1
MATERIALS AND INPUTS REQUIREMENT AND COST

Sr. No.	Description	Qty.	Cost ('000 Birr)
1	Fertilizer (tonnes)	15	45
2	Seedlings (No) *	7900	79
3	Chemicals (lt)	lumpsum	20
4	Preservatives	lumpsum	60
5	Crates	700	28
	Packing material (Cans &) cartoons	lumpsum	276
	Total		**508**

** The cost of seedling is incurred during the first year of the farm operation, while the others are annual demand for the life of the project. The plant needs also 6,667 crates initially costing Birr 266,680. The amount shown in Table 4.1 is for annual replacement (assuming 10% damage)*

B. UTILITIES

Electricity , water, fuel and lubricant are the main utilities required for the envisaged avocado farm. The types of utilities and consumption quantity and corresponding costs are depicted in Table 4.2 below. The total cost is estimated at Birr 1,021,084.

Table 4.2
UTILITIES REQUIREMENT AND COST

Sr. No	Description	Qty. (000)	Cost ('000 Birr)	Total Cost ('000 Birr)
1	Fuel (lt)	11,000	3.00	33,000
2	Lubricant (lt) kg	1,100	15	16,500
3	Electricity (kWh)	12,608	0.474	59,764
4	Water (m^3)	20,000	2.00	40,000
	Grand Total			**149,260**

V. FARM OPERATION AND PROCESSING TECHNOLOGY AND ENGINEERING

A. FARM OPERATION AND PROCESSING TECHNOLOGY

1. Agricultural Operation and Avocado Processing

a) Land Development

Land development is the first operation of the Production process in avocado production. It includes land surveying and design, planting site clearing and cleaning, levelling and irrigation land, access and farm roads construction.

b) Land Preparation

Land preparation activities like ploughing, disking, harrowing and basin formation follow the land development. Ploughing, disking and harrowing would be carried out by tractor mounted machineries while basin formation by casual labours.

c) Nursery Establishment and Propagation of Seedlings

Nursery establishment is the most important operation and initial stage in avocado planting material propagation full stop. Appropriate site selection, fencing clearing and ploughing are among the important activities of nursery establishment. It is followed by

seed bed Preparation . Raising of seedlings, grafting and handling of seedlings are some of the routine activities which are expected to be undertaken in the nursery.

d) Pre-Harvest Management

Pre- Harvest management starts with transplanting of sexually or asexually propagated seedlings of avocado from nursery to the main planting site. Cultivation for weed control and soil fertility improvement, training and pruning seedlings, irrigation water application, fertilization and insect pest and disease control are among the major pre - harvest management in avocado production.

e) Post - Harvest Management

In avocado production, Post harvest management includes picking, cleaning, grading, transporting and marketing. Transporting will be handled with trucks equipped with refrigerator.

f) Avocado Processing

Select ripe avocado and wash them with a brush washing machine. The remaining impurities are removed by an air injection washing machine. It then passes to the sorting line where damaged fruit is eliminated. Then scalding and peeling process are continued. The peeled fruit is stored in hold tank. The fruit is mixed with preservatives and flavours such as sugar, acid, pectins and vinegar. Filling in cans will continue by controlling the weight under vacuum so as to removed part of the air in the head space. Then it is sealed, treated with heat, marked, and packed in cartoon for dispatch.

2. Source Of Technology

The machinery and equipment required by the farm can be obtained from Ries-engineering and Nazareth Tractor Assembly plant, whereas planting materials like fertilizers, chemicals & seedlings, etc. could be obtained from a number of governmental and non-governmental organizations such as horticulture development required enterprises, Agricultural In put Supply Enterprise, etc. The machinery and equipment for the processing of avocado will be obtained from the following suppliers.

1) Jwala Engineering Company
6, MADHU INDL. EST., OFF 11B PATEL ROAD
GORE GAONE (E)
Mumbai - 400063, Maharashtrd, India
Phone: 91-22-56902548/56903038
Fax: 91-22-26862622

2) BBC Technologies Ltd
397 Jary Road
Hamiltonne
Phone: 6478236927
Fax: 6478236025

B. ENGINEERING

1. Farm & Plant Machinery and Equipment

The machinery and equipment required by the envisaged avocado farm and processing project are listed in Table 5.1 below. The total cost of machinery and equipment is estimated at Birr 4.4 million, out of this Birr 4.1 million will be required in foreign currency.

Table 5.1
LIST OF FARM & PLANT MACHINERY AND EQUIPMENT

Sr. No.	Description	Qty.
1.	Tractor 110 Hp -125 HP	
2.	Disk plough	1
3.	Disk Harrow of set type	1
4.	Trailers	1
5.	Sprayers	1
6.	Generator	2
7.	Workshop equipment (set)	1
8.	Tools (set)	1
9.	Hand tools / farm implements	1
10.	Tanks	2
11.	Conveyor	1
12.	Balances	2
13.	Seamer	2
14.	Dryer	1
15.	Washing machine	1
16.	Vacuum pump	1
17.	Boiler	1

2. Land, Building And Civil Works

The land development cost for 50 ha. of irrigable farm and irrigation infrastructure construction is estimated to be Birr 320,000 and cost for access roads construction in the farm compound will be Birr 125,000. The total area required for avocado production and processing plant including open area for future expansion and recreation places, stores, offices canteens, workshop, etc. is estimated to be 750m^2 and the total cost of buildings, at the rate of Birr 1200 per meter square, is expected to be Birr 0.9 million. Rural land lease cost in BGRS ranges from Birr 15 to 30 per ha.. Accordingly at the rate of Birr 30 per hectare and for 70 years of land holding, the total cost of land lease is estimated at Birr 105,000. The total cost of land, land preparation and development, buildings and civil works, assuming the total land lease cost will be paid in advance, is estimated at Birr 620,000.

3 Proposed Location

The location of the proposed avocado farm and processing plant will be in Metekel zone of the region, where there is abundant land and water for irrigation.

VI. MANPOWER AND TRAINING REQUIREMENT

A. MANPWER REQUIREMENT

The manpower required for the envisaged project is 19 permanent employees as shown in Table 6.1. According to Table 6.1, the total cost for permanent and casual labour will be Birr 280,000.

Table 6.1
MANPOWER REQUIREMENT AND ANNUAL LABOUR COST

Sr. No	Description	Req. No.	Monthly Salary (Birr)	Yearly Salary ('000 Birr)
1	Manager	1	2250	27
2.	Secretary/ Cashier	1	700	8.4
3	Horticulturist	1	2000	24
4	Irrigation Engineer	1	2000	24
5	Warehouse Specialist	1	1850	22.2
6	Accountant	1	700	8.4
7	Purchaser/Salesperson	1	800	9.6
8	Processing Plant Higher Technician	1	1000	12.0
9	Processing plant Ass, Technician	1	600	7.2
10	Tractor Operator	2	800	9.6
12	Mechanic	1	500	6.0
14	Drivers	2	500	12.0
16	Generator Operator	1	300	3.6
17	Store Keeper	1	500	6.00
18	Guards	3	600	7.2
	Sub - total	**19**		**187.2**
	Employee Benfits (25%)	-	-	46.8
	Total			**234**
	Casual labour			46
	Grand Total			**280**

B. TRAINING REQUIREMENT

Training will be given to the processing plant technicians by the supplier of the processing machine during erection and commissioning period for about two weeks. The training cost is estimated to be Birr 50,000.

VII. FINANCIAL ANALYSIS

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

Construction period	1 years
Source of finance	30 % equity

	70 % loan
Tax holidays	3 years
Bank interest	7.5 %
Discounted cashflow	8.5 %
Repair and maintenance	3 % of the total plant and machinery
Accounts receivable	30 days
Raw material, local	30 days
Work in progress	1 day
Finished products (processed)	30 days
Fresh	1 day
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 6.71 million, of which 65.92 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 ('000 BIRR)
1	Land lease value	105
2.	Site preparation and developed	445
3.	Building and Civil Work	400
4.	Farm & Plant Machinery and Equipment	4,400
5.	Office Furniture and Equipment	50
6.	Vehicle	250
7	Pre-farming Expenditure*	378.6
8	Working Capital	188.18
	Total investment cost	**6,716.82**
	Foreign share	**65.92**

* *N.B Pre-farming expenditure includes interest during construction (Birr 343,630 thousand), training (Birr 50 thousand), and (Birr 5thousand) costs of registration, licensing and formation of the company including legal fees, commissioning expenses, etc.*

B. OPERATION & PRODUCTION COST

The annual operation & production cost at full operation capacity is estimated at Birr 1.75 million (see Table 7.2). The material and utility cost accounts for 37.39 per cent while repair and maintenance take 4.32 per cent of the production cost.

Table 7.2
ANNUAL OPERATION & PRODUCTION COST ('000 BIRR)

Items	Cost	%
Raw Material and Inputs	508	28.9
Utilities	149.26	8.49
Maintenance and repair	76	4.32
Labour direct	180	10.24
Farm & Factory overheads	15.8	0.90
Administration Cost	12	0.68
Total Operating Costs	941.06	53.53
Depreciation	574	32.88
Cost of Finance	238.9	13.59
Total Production Cost	**1,754.46**	**100**

C. FINANCIAL EVALUATION

1. Profitability

According to the projected income statement, the project will start generating profit in the 3rd 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 lifetime 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 operates at full capacity (year 4) is estimated by using income statement projection.

$$BE = \frac{\text{Fixed Cost}}{\text{Sales} - \text{Variable cost}} = 38\ \%$$

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 7 years.

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 8.5% discount rate is Birr 2.29 million.

D. ECONOMIC BENEFITS

The project can create employment for 19 persons. In addition to supply of the domestic needs, the project will generate Birr 0.4 million per annum in terms of tax revenue when it starts to operate at full capacity. Moreover, the Regional Government can collect employment, income tax and sales tax revenue. The establishment of such factory will have a foreign exchange saving effect to the country by substituting the current imports.