

PREFEASIBILITY STUDY ON SETTING UP ESSENTIAL OIL PROCESSING PLANT IN NIGERIA

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ACKNOWLEDGMENT

Startup Business Foundation is thankful to all organizations and individuals who have helped in several ways in preparation of this prefeasibility study.

We also wish to extend our gratitude to all those who reviewed the content and provided valuable inputs for improving the quality, coherence, and content presentation of this prefeasibility study.

ABOUT THIS REPORT

This prefeasibility study is designed to provide potential and startups entrepreneurs' valuable information on setting up Essential Oil processing plant in the food processing industry of Nigeria's market; aimed at encouraging and facilitating industrial activities across the country. It is our realization that industrialization is at the heart of economic development and that every effort has to be made to bring about industrial growth and encourage our people to be part of it.

This essential oil processing business has over 80% local content in terms of availability of raw material, equipment and machinery, manpower and other requirements.

The key areas covered in this report include:

- i) Technical and economic analysis of the production, marketing and profitability of the project.
- ii) Recommendations in respect of procurement of equipments and associated problems.
- iii) Recommendation on suitable agronomic management practices to ensure efficient running of the projects.
- iv) Detailed financial analysis including project cash flows for the projects.

This prefeasibility report provides a comprehensive and detailed coverage of the above terms of reference and is designed to facilitate investment decisions.

The implementation of this project will also impact positively on the economy of the immediate community where the project is located. This is in terms of employment-direct and indirect, skilled and unskilled. Government also stands to benefit from internal revenue from taxation.

In view of the result of the analysis using some economic indicators as stated in the proposed project, it is hereby recommended that the project is viable.

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PREFEASIBILITY STUDY ON SETTING UP ESSENTIAL OIL PROCESSING PLANT

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PART I

1.0 EXECUTIVE SUMMARY

This particular prefeasibility study is on setting up essential oil production plant in lucrative part of Nigeria.

The project is for extraction of oil from various oil bearing plants and grasses such as: Eucalyptus, cinnamon ginger, lemons neto etc. Essential oil is highly volatile and is essentially carried away by steam without undergoing decomposition. Essential oils are produced for use in medicine and perfume manufacture, and for other industrial purposes.

This project is a small scale enterprise project which can sited in the rural or semi rural area in any part of Nigeria. The basic consideration for the setting up of the industry includes; accessibility of raw materials, infrastructures. The market for the finished products is readily available in domestic market with high export potential and return on investment.

The scale of investment generally depends on the interests of the entrepreneur and the demand for the products. In either case, the project can be scaled down or up in line with the available funds.

1.1 SUMMRY OF TOTAL PROJECT COST

S/N	DESCRIPTION	COST INCURRED	COST TO BE INCURRED	TOTAL
1	Land and building	-	360,000	360,000
2	Machinery & equipment	-	4,850,000	4,850,000
3	Utility equipment	-	1,210,000	1,210,000
4	Office equipment	-	250,000	250,000
5	Vehicle	-	2,400,000	2,400,000
	Total Capital Cost	-	9,070,000	9,070,000
6	Working capital	-	800,000	800,000
7	10% contingencies & preliminary expenses	-	787,000	787,000
	Total Project Cost	-	10,657,000	10,657,000

1.3 FINANCIAL ACCOUNTING RATIOS ANALYSIS

PERFORMANCE RATIOS AVERAGES

- (a) Return on Sales =24%
- (b) Return on Equity =870%
- (c) Return on Investment =149%
- (d) Positive NPV = ₦20,191,494
- (e) IRR =46.5%
- (f) ARR =352%
- (g) Payback Period = 10 months

PART II

MARKET ANALYSIS

2.1 INTRODUCTION

Essential oil is a vital item in pharmaceutical and perfume manufacture; as well as other industrial uses. The industrial development in the country is a healthy atmosphere for this project as it guarantees the market. There is great potential for export to the highly industrialized world.

2.2 MARKET ARE ANALYSIS

Essential Oil Market is expected to reach \$11.188 million by 2022, with a CAGR of 8.7% from 2016 to 2022. Essential oils, also known as volatile oils/aetherolea/ethereal oils, are derived from leaves, stems, flowers, bark, roots, or other parts of a plant. Essential oil is obtained from various herbs and plants, such as orange, eucalyptus, corn mint, peppermint, citronella, lemon, lime clover leaf, and spearmint, using distillation methods such as steam and water distillation. An essential oil contains volatile aroma compounds and real essence of the plant from which it is derived. Essential oils are primarily used in cosmetics & toiletries, food items and beverages.

Obviously, 90% of the essential oil used in these industries is imported from overseas which has left much to be said about the domestic producers in the country.

2.3 INDUSTRY ANALYSIS

The essential oil market is segmented on the basis of product type, application, and geography. The product segment is further classified as orange, eucalyptus, corn mint, peppermint, citronella, lime, lemon, clover leaf, spearmint, and others. Orange oil segment accounted for the maximum revenue share in 2015 and is likely to consolidate its position during the forecast period, owing to its anti-inflammatory, antidepressant, and antispasmodic product characteristics.

In addition, the food and flavor industry majorly uses orange oil due to its fresh smell and juicy flavor. Based on application, the essential oil market is classified as food & beverages, medical, cleaning & home, spa & relaxation, and others. Spa & relaxation is estimated be the fastest growing application segment, closely followed by applications Food & beverages.

2.4 TARGET MARKET ANALYSIS

Majorly, essential oils find application in the personal care and cosmetic, food and beverage, pharmaceuticals, aromatherapy, and the industrial sectors. The food and beverages and the personal care and cosmetic industries are reporting a greater demand for essential oil, owing to the increasing preference for flavored food products and beverages and fragrant cosmetics and beauty products among consumers.

Therefore, the entrepreneur should target these industries for patronage.

PART III

TECHNICAL ANALYSIS

3.1 PRODUCT DESCRIPTION

Natural essential oil is a kind of volatile, strong fragrance, which can be distilled with water vapor. As a result of natural spices plant essential oil and its derivatives have sense of smell is hard to replace synthetic fragrances and sensory characteristics, and the concern about the safety of synthetic flavors and preference for the natural flavor, enables the natural plant essential oil to maintain its strong market position.

3.2 SUITABLE LOCATION

The essential oil production is a rural micro enterprise activity. However, this project can be sited in any city in Nigeria provided there is availability of the raw material to meet up with the production capacity of the plant.

3.3 RAW MATERIAL

Essential oils are the fragrant, highly concentrated natural constituents that are found in plants such as Eucalyptus, cinnamon ginger, lemons neto etc. These plants are available in different rural areas and can as well be planted.

3.4 PRODUCTION PROCESS AND CAPACITY

The leaves are stacked in the extractor and the boiler pressure is maintained at 40 psi and distilling may vary from 3hrs to 18 hours depending on the species being distilled. The leaves are subjected to the steam and oil is extracted as it goes up in the steam. Water is separated through fractional distillation. At the end of the condenser, the water and essential oil are collected in a receiver, usually called a 'Florentine flask'. This specially designed container has two outflows in view of the fact that oil and water don't mix, i.e. the solution separates into essential oil and hydrolat. Essential oils are usually lighter than water and so will float above it.

3.5 SOURCES OF FUNDS

The project can be funded through a number of sources which include but not limited to the following; Agric-Business, Small & Medium Scale Investment Scheme (AGSMEIS), Bank of Industry, Bank of Agriculture (BOA), Nigeria Export-Import (NEXIM) Bank, International Finance Corporation (IFC), grants etc., though the conditions and criteria for accessing the loans and grants varies.

PART IV

FINANCIAL ANALYSIS

4.0

Basically, the financial section of this prefeasibility study consists of three financial statements: Income statement, Balance sheet, Cash flow projection. This section determines whether or not the project is viable using some economic indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), and payback period as are detailed in the appendices below.

4.1 ASSUMPTIONS

1. Assuming that the project will last for the period of five years and the salvage value at the end of the project life ignored.
2. The Machineries, Equipments and Utility Equipment have uniform depreciation of 20%.
3. Production costs assumed 312 days per year with daily capacity of producing 600 litres of essential oil assumed to be 60% installed capacity.
4. The proposed capacity utilization are 60% in the first year of commercial production, 70%, 80% in the 2nd and 3rd year respectively and 90% in the 4th and 5th years.
5. Raw materials will be sourced locally and Market for the product is readily available.
6. Staff and labour cost will increase by 10% yearly.
7. Prices and unit costs are assumed unchanged in the five years of projection.
8. The valuation currency used is naira

4.2 ACCOUNTING /FINANCIAL ANALYSIS

4.2.1 NET PROFIT

The projected Annual Trading Profit and Loss Account is proposed to make the following Net Profit after tax during the corresponding projected periods – all things being equal.

4.2.2 NET PRESENT VALUE (NPV)

NPV is one of the four methods of discounted cash flows techniques which state that money that is immediately available for use, has a greater value than same amount receivables in future date.

Using this method however, all net cash inflows will be discounted to present value using the estimated interest rate of 60% discount factor. At 12% discount factor the project produced a positive **NPV NGN 120,191,494**

4.2.3 INTERNAL RATE OF RETURN (IRR)

This is the discount rate which gives zero NPV or the rate which equates the present value of cash inflows with present value of cash outflows of the project.

The cash flow of this project was discounted systematically until the NPV of the project finally become zero. The project produces the **IRR** of **46.5%**. Thus, the project accepted as being viable. This is because **IRR** is more than the cost of capital.

4.2.4 ACCOUNTING RATE OF RETURN (ARR)

ARR uses accounting information as revealed by financial statements (Income Statement) to measure profitability of the project under consideration. The forecast **ARR** of the project is **352.13%**.

4.2.5 PROFITABILITY INDEX (PI)

This is the present value of future cash flows over the present value of cash outlays. The project PI further confirm the viability of the project , because as the rules of the accepting and rejecting hold, a project should be accepted if the PI is equal or greater than one (1). Consequently, the PI of this project is **1.72** and thus recommended as being viable to be accepted for financing.

APPENDIX I
TOTAL PROJECT COST

S/N	DESCRIPTION	QTY	UNIT PRICE	TOTAL
	LAND AND BUILDING			
1	Factory rentage	1	360,000	360,000
	Sub total		360,000	360,000
	MACHINERY & EQUIPMENT			
2	Fractional Distillation with Condenser with complete accessories	1	2,500,000	2,500,000
3	Steam generating tank	1	1,600,000	1,600,000
4	Laboratory equipment	1	750,000	750,000
	Sub total		4,850,000	4,850,000
	UTILITY EQUIPMENT			
5	Generating set	1	1,150,000	1,150,000
6	Other tools	-	60,000	60,000
	Sub total		1,210,000	1,210,000
	OFFICE EQUIPMENT			
7	Computer & printer	1	200,000	200,000
8	Furniture & Fittings	1-	50,000	50,000
	Sub total		250,000	250,000
	VEHICLE			
9	Truck (3-tons)	1	2,400,000	2,400,000
	Sub total		2,400,000	2,400,000
	Total Capital Cost		9,070,000	9,070,000
10	Working capital		800,000	800,000
11	10% contingencies & preliminary expenses		787,000	787,000
	Total Project Cost		10,657,000	10,657,000

APPENDIX II
ESTIMATION OF WORKING CAPITAL REQUIREMENT

N'ooo

Year of Commercial Operation	2 weeks	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization (Inventory)	60%	70%	80%	90%	90%
1 week stock of raw material	350	8,194	11,713	15,530	15,530
1 Day stock of finished products	90	3,443	4,887	5,376	5,376
Work in Progress	40	1,071	1,098	1,169	1,169
Bank/ Cash (5% sales of the products)	79	2,287	2,516	2,768	2,768
Sub Total	559	14,995	20,214	24,843	24,843
Working capital	559	11,248	13,192	15,419	15,419

APPENDIX III
FINANCING PLAN

N

DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	2,624,960		2,624,960
Term loan from	-	8,000,000	8,000,000
Total project cost	2,657,000	8,000,000	10,657,000
% Contribution	15%	75%	100%

APPENDIX IV
TERM LOAN REPAYMENT SCHEDULE

LOAN AMOUNT: 8,000,000 (Eight Million Naira)
 TYPE : ANY LOCAL AVAILABLE SME FUND
 INTEREST RATE USED: 12%
 REPAYMENT: 5 YEARS EQUAL INSTALLMENT (Annually)

YEAR	OPENING BALANCE	REPAYMENT	INTEREST DUE	TOTAL YEAR INTEREST
1	8,000,000	1,600,000	960,000	2,560,000
2	6,400,000	1,600,000	768,000	2,368,000
3	4,800,000	1,600,000	576,000	2,176,000
4	3,200,000	1,600,000	384,000	1,984,000
5	1,600,000	1,600,000	192,000	1,792,000
Total		8,000,000	2,880,000	10,880,000

APPENDIX V
FORECAST STAFFING SCHEDULE (1ST OPERATIONAL YEAR)
N'ooo

POSITION	No	Unit Scale	Scale/ Month	Scale / Year
DIRECT LABOUR				
Factory Manager	1	60	60	720
Unskilled labour	4	30	120	1,440
Sub total	5	90	120	2,160
INDIRECT LABOUR				
Accounts/ Admin	1	50	50	600
Marketing Officer	2	40	80	960
Driver	1	40	40	480
Sub total	4	130	170	2,040
Total on staff (1st year)	10	220	290	4,200

APPENDIX VI
ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE
N'

ITEMS	INITIAL VALUE	DEPRECIATION (20%)
Machinery and Equipments	3,850,000	770,000
Utility Equipments	210,000	42,000
Office Equipments	250,000	50,000
Vehicle	2,400,000	480,000
TOTAL	6,710,000	1,342,000

APPENDIX VII
ESTIMATION OF ADMINISTRATIVE / OVERHEAD EXPENSES
N'

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Selling and Distribution	1,328,400	1,394,820	1,461,240	1,534,302	1,534,302
Cleaning and Toiletries	226,800	238,140	249,480	261,954	261,954
Utilities (Power & water)	1,904,400	1,999,620	2,094,840	2,199,582	2,199,582
Miscellaneous	900,000	945,000	990,000	1,039,500	1,039,500
TOTAL	4,359,600	4,577,580	4,795,560	5,035,338	5,035,338

APPENDIX VIII
ESTIMATION OF PRODUCTION AND OPERATION COSTS
N'

Cost Item	Units	@	Qty/	Pdn Cost/ day	Pdn Cost/ mth	Pdn Cost/yr
Direct Costs						
Fresh Leaves and twigs	Tons	195,000	1	195,000	5,915,000	60,840,000
Water	Ltrs	1.2	3,000	3,600	93,600	1,123,200
Packaging materials	Pcs	450	64	28,800	748,800	8,985,600
Sub-total		195,451.2	3,065	227,400	5,912,400	70,948,800

APPENDIX IX
ESTIMATION OF RAW MATERIAL/PRODUCTION COST AND SALES

Year of Commercial Production	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization	60%	70%	80%	90%	90%
1. Output					
Essential Oil	157,664	173,430	189,197	208,116	208,116
Total output	157,664	173,430	189,197	208,116	208,116
2. Cost of Production	N'	N'	N'	N'	N'
Essential Oil @ N450 (kg)	70,948,800	78,043,500	85,138,650	93,652,200	93,652,200
Total cost of production	70,948,800	78,043,500	85,138,650	93,652,200	93,652,200
3. SALES					
Essential Oil @ N810 (kg)	127,707,840	140,478,300	153,249,570	168,573,960	168,573,960
TOTAL SALES/ TURNOVER	127,707,840	140,478,300	153,249,570	168,573,960	168,573,960

APPENDIX X
FORECAST INCOME STATEMENT (PROFIT & LOSS ACCOUNT)

Year of commercial operation	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization	60%	70%	80%	90%	90%
1. SALES	N'	N'	N'	N'	N'
Gross Sales	127,707,840	140,478,300	153,249,570	168,573,960	168,573,960
VAT @ 5%	6,385,392	7,023,915	7,662,478.5	8,428,698	8,428,698
Net Revenue	121,322,448	133,454,385	145,587,092	160,145,262	160,145,262
2. OPERATION COST					
Cost of Raw materials consumed	70,948,800	78,043,500	85,138,650	93,652,200	93,652,200
Staff and labour	4,200,000	4,410,000	4,620,000	4,851,000	4,851,000
Admin. & Overhead Expenses	4,359,600	4,577,580	4,795,560	5,035,338	5,035,338
Depreciation	1,342,000	1,342,000	1,342,000	1,342,000	1,342,000
Total Operating Cost	80,850,400	88,373,080	95,896,210	104,880,538	104,880,538
3. OTHER COSTS					
Interest on Term Loan (12%)	960,000	768,000	576,000	384,000	192,000
Loan Repayment	1,60,000	1,60,000	1,60,000	1,60,000	1,60,000
Total (Other Costs)	81,810,400	89,141,080	96,472,210	105,264,538	105,072,538
Profit Before Tax	39,512,048	44,313,305	49,114,882	54,880,724	55,072,724
Corporate Tax @ 30%	11,853,614.4	13,293,991.5	14,734,464.45	16,464,217.2	16,521,817.2
Profit after tax (NET PROFIT)	27,658,434	31,019,314	34,380,417	38,416,507	38,550,907
% Return on Sales	0.228	0.232	0.236	0.239	0.241
% Return on Equity	73.2	80.5	87.9	96.7	96.7
% Return on Investment	12.6	13.8	15.1	16.6	16.6

APPENDIX XI

FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV
	N'ooo		N'ooo
0	(10,657,000)	1	(10,657,000)
1	59,545,000	0.893	24,698,981.6
2	75,657,000	0.797	24,722,393.3
3	91,718,000	0.712	24,478,856.9
4	108,443,000	0.636	24,432,898.5
5	109,912,000	0.567	21,858,364.3
Total Profit	445,275,000		120,191,494
Average Profit	89,055,000		

Year	C/F	DF 60%	NPV
	N'ooo		N'ooo
0	(10,657,000)	1	(10,657,000)
1	27,658,434	0.625	17,286,521.3
2	31,019,314	0.3906	12,116,144
3	34,380,417	0.2441	8,392,259.79
4	38,416,507	0.1526	5,862,358.97
5	38,550,907	0.0954	3,677,756.53
Total Profit	170,025,579		47,335,041
Average Profit	34,005,115.8		

APPENDIX XII
FORECAST IRR AND ARR COMPUTATION

$$IRR = a + \frac{A}{A+B} (b-a)$$

Where

$$a = 12\%$$

$$b = 60\%$$

$$A = 120,191,494$$

$$B = 47,335,041$$

$$\begin{aligned} &12\% + \frac{120,191,494}{120,191,494 + 47,335,041} (60-12) \\ &12\% + 34.5 \\ &\mathbf{46.5\%} \end{aligned}$$

$$ARR = \frac{\text{Estimated Average Profit} \times 100}{\text{Estimated initial investment}}$$

$$\begin{aligned} ARR &= \frac{34,005,115.8 \times 100}{9,657,000} \\ &\mathbf{352\%} \end{aligned}$$

**APPENDIX XIII
CASH FLOW PROJECTION**

Year of Comm. Production	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
% Capacity Utilization		60%	70%	80%	90%	90%
A) CASH RECEIPTS	N'	N'	N'	N'	N'	N'
Equity Capital	2,624,960	-	-	-	-	-
Term Loan	8,000,000	-	-	-	-	-
Gross Revenue		121,322,448	133,454,385	145,587,092	160,145,262	160,145,262
Total Receipts	10,657,000	121,322,448	133,454,385	145,587,092	160,145,262	160,145,262
B) CASH PAYMENTS						
Capital Payment						
Machinery & Equipments	3,850,000	-	-	-	-	-
Utility Equipment	210,000					
Office equipments	250,000					
Vehicle	2,400,000	-	-	-	-	-
TOTAL	6,710,000	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	1,342,000	1,342,000	1,342,000	1,342,000	1,342,000
Change in working capital	3,947,000	79,508,400	87,031,080	94,554,210	103,538,538	103,538,538
Sub total	3,947,000	80,850,400	88,373,080	95,896,210	104,880,538	104,880,538
(iii) Financial Expenses						
Repayment of Term Loan	-	1,60,000	1,60,000	1,60,000	1,60,000	1,60,000
Interest on Term Loan	-	960,000	768,000	576,000	384,000	192,00
Value Added Tax	-	6,385,392	7,023,915	7,662,478.5	8,428,698	8,428,698
Corporate Tax	-	11,853,614.4	13,293,991.5	14,734,464.45	16,464,217.2	16,521,817.2
Sub total	-	19,199,006	21,085,907	22,972,943	25,276,915	24,950,515
Total cash payment (ii)-(iii)	3,947,000	61,651,394	67,287,174	72,923,267	79,603,623	79,930,023
Net cash flow c/f	3,947,000	61,651,394	67,287,174	72,923,267	79,603,623	79,930,023

**APPENDIX XIV
BALANCE SHEET PROJECTION**

Year of comm. Operation	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
ASSETS	N'000	N'000	N'000	N'000	N'000	N'000
(i) Fixed assets						
Machinery and Equipments	3,850,000	-	-	-	-	-
Utility equipment	210,000					
Office Equipment	250,000					
Vehicle	2,400,000	-	-	-	-	-
Value at Acquisition		6,710,000	6,710,000	6,710,000	6,710,000	6,710,000
Less Cumulated Depreciation	-	1,342,000	2,684,000	4,026,000	5,368,000	6,710,000
Net fixed assets	6,710,000	5,368,000	4,026,000	2,684,000	1,342,000	0
(ii)Current Assets/ liability						
Stock of Raw Materials	800,000	33,239,984	65,751,668	74,343,616	83,437,427	72,143,633
Debtors /prepayment	-	11,453,000	12,098,000	13,308,000	14,139,000	15,653,000
Bank and Cash Balances	3,147,000	4,150,024	5,160,031	6,170,539	7,180,674	7,180,741
Creditor / accruals	-	(4,074,000)	(6,039,000)	(8,947,000)	(11,013,000)	(13,785,000)
Company Tax	-	(11,853,614)	(13,293,991)	(14,734,464)	(16,464,217)	(16,521,817.2
Net current assets	3,947,000	32,915,394	63,676,708	70,140,691	77,279,884	81,192,374
TOTAL NET ASSETS	10,657,000	38,283,394	67,702,708	72,824,691	78,621,884	81,192,374
(ii) FINANCED BY						
Equity Capital	2,624,960	2,624,960	2,624,960	2,624,960	2,624,960	2,624,960
P&L	-	27,658,434	31,019,314	34,380,417	38,416,507	38,550,907
Retained Profit	-	-	27,658,434	31,019,314	34,380,417	38,416,507
SHAREHOLDERS FUND	2,624,960	30,283,394	61,302,708	68,024,691	75,421,884	79,592,374
Long Term Loan	8,000,000	8,000,000	6,400,000	4,800,000	3,200,000	1,600,000
TOTAL EQUITY & LIABILITY	10,657,000	38,283,394	67,702,708	72,824,691	78,621,884	81,192,374