

PREFEASIBILITY STUDY ON SETTING UP CORNFLAKES MANUFACTURING UNIT IN NIGERIA

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ABOUT THIS REPORT

This prefeasibility study is designed to provide potential and startups entrepreneurs' valuable information on setting up corn flask manufacturing business 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.

The corn flask manufacturing 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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PART I

EXECUTIVE SUMMARY

The prefeasibility study embodied on the report is on setting up cornflakes manufacturing unit in most suitable part of Nigeria.

Cornflakes are one of the most consumed breakfast cereals on account of their taste and nutritional value. They have a high market potential as they are consumed by adults, youth and children. However, it is difficult for a competitor to break into a market if there is no established operator who knows the market well, has good relationship with the key buyers and suppliers, and knows how to overcome market and operating problem. Therefore, the entrepreneur needs experienced business development officer to create a market niche for the product.

The industrial plant should be setup in consideration to proximity of raw materials source(s), basic infrastructure and market accessibility.

The proposed project production capacity is on 700 kilograms of cornflakes a day working 312 days in a year at 60% capacity utilization. Although the investment scale of the project could be increased or decreased depending on funding capacity of the entrepreneur.

1.2 SUMMARY OF TOTAL PROJECT COST

S/N	DESCRIPTION	COST INCURRED	COST TO BE INCURRED	TOTAL
1	Land & building	-	600,000	600,000
2	Machinery & equipments	-	6,556,400	8,404,400
3	Utility equipment	-	1,850,000	1,850,000
4	Office equipments	-	350,000	350,000
5	Vehicle	-	3,000,000	3,000,000
	Total capital cost	-	12,356,400	14,204,400
6	Working capital	-	2,650,000	2,650,000
7	Contingencies & preliminary expenses	-	1,685,440	1,685,440
	Total Project cost	-	16,691,840	18,539,840

1.3 FINANCIAL ACCOUNTING RATIOS ANALYSIS

PERFORMANCE RATIOS AVERAGES

- (a) Return on Sales = 18%
- (b) Return on Equity = 278%
- (c) Return on Investment = 66%
- (d) Positive NPV = ₦44,338,421
- (e) IRR = 46.7%
- (f) ARR = 66%
- (g) Payback period = 1 year and 10 months

PART II MARKET ANALYSIS

2.1 INTRODUCTION

Hot cereals are expected to register the fastest growth during the forecast period. Rising adoption of nutritious meal options in breakfast is spurring the demand for multi-grain cereals including grains, seeds, and beans. Vast benefits of including these organic and whole grain-based cereals in the diet are further escalating the demand for hot cereals. Moreover, incorporation of exotic flavors into the product variants, resulting in innovative tastes, is anticipated to rev up the demand, especially among kids.

2.2 MARKET AREA ANALYSIS

Due to the changing lifestyle of people, it becomes difficult to prepare food and manage their hectic schedule for consumers. To address this issue, high fiber and protein food manufacturers are continually developing and launching the new ready to eat products. Cereal flakes have been a regular feed for a large population globally; the product constitutes a significant part in the daily diet of consumers. Rice, wheat, and corn are among the major cereal crop used for producing the flakes. Cereal crops are anticipated to remain the prominent crop in the developing countries, owing to the consumer inclination towards ready to eat food. Cereals flakes are either consumed plain or coated with sugar, honey, fruit flavor, malted ingredient, chocolate, and others. Furthermore, cereal flakes are available in various shape and sizes vary with the type of crop is used to produce cereal flakes. With the production and consumption of multicereal or multigrain flakes, new trend evolved in the food and feed industry.

2.3 INDUSTRY OUTLOOK

The global breakfast cereal market size was valued at USD 37.44 billion in 2016. It is projected to expand at a CAGR of 4.3% from 2017 to 2025. Growing popularity of on-the-go breakfasts, coupled with surging demand for organic cereals and rising health awareness among consumers, is one of the key trends accelerating market growth.

Increasing influence of westernization on food habits of the middle-class population is also contributing significantly towards the demand for breakfast cereals in Asia Pacific. Advancing food retail infrastructure along with rising awareness regarding the health benefits of consuming grain-based breakfasts is further supporting the growth of the market. The market is also observing upswing in adoption of cereal bars among kids. Attractive packaging, effective advertising strategies, and improved taste are among the key factors fueling its demand.

2.4 TARGET MARKET

This product is mostly for domestic consumption. Therefore, the entrepreneur should target supermarkets, groceries shops, public markets. Even though there major brands in

the industry such as Nasco, Kellogg's, Supreme, Good morning etc, however, the demand by far strips it the supply especially with increase in population index annually.

PART III

TECHNICAL ANALYSIS

3.1

3.1 PRODUCT DESCRIPTION

Corn flakes being one of most nutritious foods and is consumed as breakfast food not only in Nigeria but-elsewhere in the world. Basically, it is prepared from maize; this is the main raw material. Flavours, like sugar or salt, are also added.

3.2 LOCATION ANALYSIS

This project can be sited in any part of the country with consideration to accessibility of basic raw materials and market for the finished products.

3.3 RAW MATERIALS

Maize, the main raw material, is itself a corn grain. The maize is processed for the manufacture of oil, flour, starch, liquid glucose, dextrose etc. Besides popcorn, another snack foods made from maize, maize is also used for the manufacture of corn flakes. Roasted corn flakes are generally used as breakfast good with milk.

3.4 MANUFACTURING PROCESS

Maize grains are cleaned using air classifiers and after separated (large and small grains) using a mesh screen separator. The grains are then polished and milled to remove germs and bran. The milled grains are cooked in a rotary steam cooker where flavor syrups of sugar, malt, salt, and water are added. The grain pieces are then washed and small grains are separated.

The grains are then carried to an agitator pump or lump breaker then sent to a steamer where pre-heated air is blown into the grains so as to reduce the moisture content to the desired level of about 20%. The dried material is then kept in a de-moisturizing tank for a few hours for moisture to equally be distributed. The grits (cooked material) are then washed again and passed through a heavy flaking machine where they are turned into flakes by pressing. The flakes are immediately transferred to a rotary oven for roasting. After roasting, the flakes are inspected, screened and graded to remove standard flakes. The flakes are then packed in water resistant polythene containers of waxed paper.

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 10%.
3. The installed capacity has estimated capacity of 218,400 kg per annum at 60% capacity utilization.
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 36,393,448**

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 **46.7%**. 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 **66%**.

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.

4.2.6 PAYBACK PERIOD

The payback period of any project is the length of time it would take the business investors to recover the capital invested in a project in spite of asset replacement. For this particular project the capital investment is expected to be fully recovered in about one year and 10 months.

APPENDIX I
TOTAL PROJECT COST

S/N	DESCRIPTION	QTY	UNIT COST	TOTAL
	LAND & BUILDING			
	Factory rentage	1	600,000	600,000
	Sub total	1	600,000	600,000
	MACHINERY & EQUIPMENTS			
1	Brick stores for corn grain	1	240,000	240,000
2	Air classifiers	2	260,000	520,000
3	Separators	3	244,000	732,000
4	Storage bins	6	220,000	1,320,000
5	Weight balance	1	120,000	120,000
6	Rotary steam cooker	1	728,000	728,000
7	Agitator or lump breaker	1	480,000	480,000
8	Pan cooler or steamer	1	240,000	240,000
9	Germ separator	1	192,000	192,000
10	Heavy flaking machine	1	1,276,400	1,276,400
11	Rotary oven	1	800,000	800,000
12	Conveyer	1	240,000	240,000
13	Inspection conveyer	1	220,000	220,000
14	Packing machine	1	280,000	280,000
15	Screening and cooling equipment	1	216,000	216,000
16	Mixer	1	120,000	120,000
17	Mini boiler	1	440,000	440,000
18	Shifter	1	240,000	240,000
	Sub total		6,556,400	8,404,400
	UTILITY EQUIPMENT			
17	Generator	1	1,250,000	1,250,000
18	Borehole & other utility accessories	1	600,000	600,000
	Sub total	2	1,850,000	1,850,000
	OFFICE EQUIPMENTS			
19	Computer & printer	1	200,000	200,000
20	Furniture & fittings	1	150,000	150,000
	Sub total	2	350,000	350,000
	VEHICLE			
21	Delivery van	1	3,000,000	3,000,000
	Sub total	1	3,000,000	3,000,000
	Total capital cost		12,356,400	14,204,400
22	Working capital		2,650,000	2,650,000
23	Contingencies & preliminary expenses		1,685,440	1,685,440
	Total Project cost		16,691,840	18,539,840

APPENDIX II ESTIMATION OF WORKING CAPITAL REQUIREMENT

N'

Year of Commercial Operation	2 Months
% Capacity Utilization (Inventory)	60%
2 Months stock of raw material	896,000
7 Day stock of finished products	554,000
Work in Progress	240,000
Bank/ Cash (preoperational expenses)	110,000
Working capital	1,800,000

APPENDIX III FINANCING PLAN

N

DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	6,539,840		6,539,840
Term loan from	-	12,000,000	12,000,000
Total project cost	6,539,840	12,000,000	18,539,840
% Contribution	35%	65%	100%

APPENDIX IV TERM LOAN REPAYMENT SCHEDULE

LOAN AMOUNT: 12,000,000 (Twelve 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	12,000,000	2,400,000	1,440,000	3,840,000
2	10,600,000	2,400,000	1,272,000	3,672,000
3	8,200,000	2,400,000	984,000	3,384,000
4	6,800,000	2,400,000	816,000	3,216,000
5	2,400,000	2,400,000	288,000	2,688,000
Total		12,000,000	4,800,000	16,800,000

APPENDIX V FORECAST STAFFING SCHEDULE (1ST OPERATIONAL YEAR)

N'ooo

POSITION	No	Unit Scale	Scale/ Month	Scale / Year
DIRECT LABOUR				
Factory Manager	1	80	80	960
Production Manager	1	60	60	720
Unskilled labour	8	30	240	2,880
Sub total	10	90	120	4,560
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)	14	220	290	6,600

APPENDIX VI ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE

N'

ITEMS	INITIAL VALUE	DEPRECIATION (20%)
Machinery and Equipments	6,708,000	1,341,600
Utility Equipments	1,850,000	370,000
Office Equipments	350,000	70,000
Vehicle	3,000,000	600,000
TOTAL	11,908,000	2,381,600

APPENDIX VII ESTIMATION OF ADMINISTRATIVE / OVERHEAD EXPENSES

N'ooo

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Selling and Distribution	2,800	3,180	3,560	4,016	4,016
Repairs & Servicing	1,800	1,980	2,160	2,376	2,376
Utilities (Power & water)	2,800	3,080	3,360	3,696	3,696
TOTAL	7,400	8,240	9,080	10,088	10,088

APPENDIX VIII ESTIMATION OF RAW MATERIAL/PRODUCTION COST

Item	Units	@/ day	Qty/ day	Pdn Cost/ day	Pdn Cost/ month	Production Cost/Year ¹
Direct costs³:						
Maize	Kgs	75.6	1,000	75,600	1,474,200	17,690,400
Salt	Kgs	180	50	9,000	175,500	2,106,000
Sub total					1,649,700	19,796,400

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					
Cornflakes	218,400	240,240	262,080	288,288	288,288
Total output	218,400	240,240	262,080	288,288	288,288
2. Cost of Production	N'	N'	N'	N'	N'
Cornflakes @ N90.6 (kgs)	19,796,400	21,776,040	23,755,680	26,131,248	26,131,248
Total cost of production	19,796,400	21,776,040	23,755,680	26,131,248	26,131,248
3. SALES					
Cornflakes @ N235 (kgs)	40,404,000	44,444,400	48,484,800	53,333,280	53,333,280
TOTAL SALES/ TURNOVER	40,404,000	44,444,400	48,484,800	53,333,280	53,333,280

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	51,324,000	56,456,400	61,588,800	67,747,680	67,747,680
VAT @ 5%	2,566,200	2,822,820	3,079,440	3,387,384	3,387,384
Net Revenue	48,757,800	53,633,580	58,509,360	64,360,296	64,360,296
2. OPERATION COST					
Cost of Raw materials consumed	19,796,400	21,776,040	23,755,680	26,131,248	26,131,248
Staff and labour	6,600,000	7,260,000	7,986,000	8,785,000	8,785,000
Admin. & Overhead Expenses	7,400,000	8,240,000	9,080,000	10,088,000	10,088,000
Depreciation	2,381,600	2,381,600	2,381,600	2,381,600	2,381,600
Total Operating Cost	36,178,000	39,657,640	43,203,280	47,385,848	47,385,848
3. OTHER COSTS					
Interest on Term Loan (12%)	1,440,000	1,272,000	984,000	816,000	288,000
Loan Repayment	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000
Total (Other Costs)	40,018,000	43,329,640	46,587,280	50,601,848	50,073,848
Profit Before Tax	8,739,800	10,303,940	11,922,080	13,758,448	14,286,448
Corporate Tax @ 12%	1,048,776	1,236,472.8	1,430,649.6	1,651,013.76	1,714,373.76
Profit after tax (NET PROFIT)	7,691,024	9,067,467	10,491,430	12,107,434	12,572,074
% Return on Sales	0.16	0.17	0.18	0.19	0.20
% Return on Equity	2.06	2.43	2.81	3.24	3.36
% Return on Investment	0.49	0.58	0.67	0.77	0.80

APPENDIX XI

FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV
	N'		N'
0	(15,738,800)	1	(15,738,800)
1	7,691,024	0.893	6,868,084
2	9,067,467	0.797	7,226,771
3	10,491,430	0.712	7,469,898
4	12,107,434	0.636	7,700,328
5	12,572,074	0.567	7,128,366
Total Profit	51,929,429		36,393,448
Average Profit	10,385,886		

Year	C/F	DF 60%	NPV
	N'		N'
0	(15,738,800)	1	(15,738,800)
1	7,691,024	0.625	4,806,890
2	9,067,467	0.3906	3,541,752
3	10,491,430	0.2441	2,560,958
4	12,107,434	0.1526	1,847,594
5	12,572,074	0.0954	1,199,376
Total Profit	51,929,429		13,956,571
Average Profit	10,385,886		

APPENDIX XII FORECAST IRR AND ARR COMPUTATION

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

Where

$$a = 12\%$$

$$b = 60\%$$

$$A = 36,393,448$$

$$B = 13,956,571$$

$$\begin{aligned} & 12\% + \frac{36,393,448}{36,393,448 + 13,956,571} (60-12) \\ & 12\% + 34.7 \\ & \mathbf{47\%} \end{aligned}$$

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

$$\begin{aligned} ARR &= \frac{10,385,886 \times 100}{15,738,800} \\ & \mathbf{66\%} \end{aligned}$$

**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	6,539,840	-	-	-	-	-
Term Loan	12,000,000	-	-	-	-	-
Gross Revenue	-	48,757,800	53,633,580	58,509,360	64,360,296	64,360,296
Total Receipts	18,539,840	48,757,800	53,633,580	58,509,360	64,360,296	64,360,296
B) CASH PAYMENTS						
Capital Payment						
Machinery & Equipments	6,708,000	-	-	-	-	-
Utility Equipment	1,850,000	-	-	-	-	-
Office equipments	350,000	-	-	-	-	-
Vehicle	3,000,000	-	-	-	-	-
TOTAL	11,908,000	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	2,381,600	2,381,600	2,381,600	2,381,600	2,381,600
Change in working capital	6,631,840	33,796,400	37,276,040	40,821,680	45,004,248	45,004,248
Sub total	6,631,840	36,178,000	39,657,640	43,203,280	47,385,848	47,385,848
(iii) Financial Expenses						
Repayment of Term Loan	-	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000
Interest on Term Loan	-	1,440,000	1,272,000	984,000	816,000	288,000
Value Added Tax	-	2,566,200	2,822,820	3,079,440	3,387,384	3,387,384
Corporate Tax	-	1,048,776	1,236,472.8	1,430,649.6	1,651,013.76	1,714,373.76
Sub total	-	7,454,976	7,731,293	7,894,090	8,254,398	7,789,758
Total cash payment (ii)-(iii)	6,631,840	28,723,024	31,926,347	35,309,190	39,131,450	39,596,090
Net cash flow c/f	6,631,840	28,723,024	31,926,347	35,309,190	39,131,450	39,596,090

**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	6,708,000	-	-	-	-	-
Utility equipment	1,850,000	-	-	-	-	-
Office Equipment	350,000	-	-	-	-	-
Vehicle	3,000,000	-	-	-	-	-
Value at Acquisition	-	11,908,000	11,908,000	11,908,000	11,908,000	11,908,000
Less Cumulated Depreciation	-	2,381,600	4,763,200	7,144,800	9,526,400	11,908,000
Net fixed assets	11,908,000	9,526,400	7,144,800	4,763,200	2,381,600	0
(ii)Current Assets/ liability						
Stock of Raw Materials	2,650,000	11,959,238	21,770,973	24,434,648	27,901,444	27,284,981
Debtors /prepayment	-	1,453,000	2,098,000	3,308,000	4,139,000	5,653,000
Bank and Cash Balances	3,981,840	8,415,002	10,160,031	12,170,539	14,180,674	16,180,741
Creditor / accruals	-	(4,074,000)	(6,039,000)	(8,947,000)	(11,013,000)	(13,785,000)
Company Tax	-	(1,048,776)	(1,236,472.8)	(1,430,649.6)	(1,651,013.76)	(1,714,373.76)
Net current assets	6,267,280	16,704,464	26,753,531	29,535,537	33,557,104	33,619,348
TOTAL NET ASSETS	18,539,840	26,230,864	33,898,331	34,298,737	35,938,704	33,619,348
(ii) FINANCED BY						
Equity Capital	6,539,840	6,539,840	6,539,840	6,539,840	6,539,840	6,539,840
P&L	-	7,691,024	9,067,467	10,491,430	12,107,434	12,572,074
Retained Profit	-	-	7,691,024	9,067,467	10,491,430	12,107,434
SHAREHOLDERS FUND	6,539,840	14,230,864	23,298,331	26,098,737	29,138,704	31,219,348
Long Term Loan	12,000,000	12,000,000	10,600,000	8,200,000	6,800,000	2,400,000
TOTAL EQUITY & LIABILITY	18,539,840	26,230,864	33,898,331	34,298,737	35,938,704	33,619,348