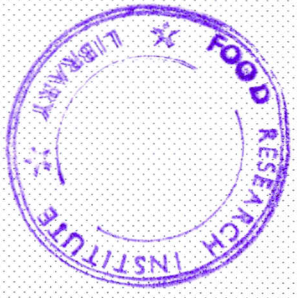
FOOD RESEARCH INSTITUTE (CSIR)

TECHNO-ECONOMIC GUIDE FOR THE ESTABLISHMENT OF A GROUNDNUT PASTE PRODUCTION PLANT



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SUMMARY

The need to prepare research outputs into attractive packages for targeted groups or user agencies has resulted in the preparation of this Techno-economic Guide. The guide is designed to facilitate investment decision making by already operating and potential entrepreneurs interested in the establishment of a Groundnut Paste Production Plant.

The model used in this guide is based on the use of a rented factory building for a plant with processing capacity of 600kg of groundnut a day under conditions prevailing in Accra.

Factors affecting the location of the plant are considered. These include the availability of raw materials, power, water, labour, facilities for waste disposal, transport etc.

The fixed capital outlay is estimated at ¢6,162,530.00 with a working capital of ¢17,505,260.00, thus giving a total investment capital of ¢23,667,790.00.

Return on Investment averaging 70% can be registered within five years of operation.

The venture shows an Internal Rate of Return (IRR) of 61% after all financial obligations have been settled.

The guide concludes, that given the factor costs used and assumptions made the selected model shows high financial returns/viability and therefore, it is recommended for adoption.

1.0 INTRODUCTION

Groundnut production occupies an important position in the agricultural programmes of farmers in Northern Ghana. It has many domestic and industrial uses. One major product from groundnut is the groundnut paste. The paste is used in the preparation of soups and stews and as breadspread. The traditional preparation of groundnut paste involves an arduous process, hence households prefer to purchase from the open market. However, groundnut paste sold on the open market is to a large extent adulterated with cheap flours and sometimes contaminated with sand and may be unsafe for consumption because it may contain high levels of micotoxins, especially aflatoxins.

This techno-economic guide relates to a groundnut paste production plant which uses an improved and mechanized method in the roasting, dehulling and milling processes leading to a high quality product and increased production.

The objective of this guide is to introduce the improved method of groundnut paste production with its cost/benefit factors to the prospective small scale processor/entrepreneur in order to facilitate investment decision making.

Basic machinery requirement essential for the establishment and successful operation of the plant have been indicated in the guide. Also provided is a list of manufacturers and suppliers of the major machinery for the plant.

Although there has not been any econometric estimation of the market for the product, the guide assumes an indication of a good market potential. It is the optimism of the authors that this techno-economic guide will serve its purpose of providing valuable information to potential small scale investor/entrepreneur.

2.0 GENERAL ASPECTS OF GROUNDNUT PASTE PRODUCTION

2.1 Prerequisites for a groundnut paste production plant

The establishment of a groundnut paste production plant requires the existence of certain basic factors. Some of the major factors are as listed below:

i. Adequate supply of raw materials

ii. A suitable site for the plant

iii. Adequate supply of potable water

iv. Constant and reliable supply of electricity and suitable fuel for the operation of the roaster

v. Sufficient and suitable labour for processing

vi. Adequate transport facilities

vii. Adequate facilities for waste disposal

viii. Adequate area at plant site for initial needs including storage and possible future expansion.

ix. Technological expertise

The most important of the above factors is the availability of suitable raw materials. To ensure this, the plant should IDEALLY be located within the growing areas. Close co-operation between the plant and growers of the raw materials is also necessary to ensure successful operation. Equally important is the quality of raw material from the supply source. Where the plant is not located in the growing area, RELIABLE raw material supply is very essential to the success of the project.

2.2 Process description

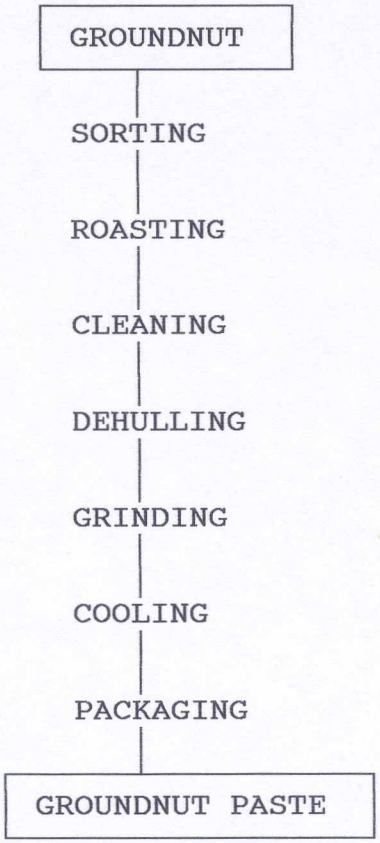
Fig. 1 shows a flow chart for the groundnut paste production. Groundnut is sorted through picking and roasted. The roasted groundnut is cleaned, dehulled and milled. This is allowed to cool (overnight) and packaged in appropriate polythene pouches or plastic cans. The recovery rate is about 67%.

3.0 THE PLANT MODEL

The model under consideration uses a rented factory building which accommodates partially mechanized plant with daily processing capacity of 600 kg of raw material.

It is evaluated on the basis of a 1-shift, 8-hour per day, 5-day per week and 48 weeks working regime. The remaining time is used for cleaning, maintenance and repairs of the plant and also for holidays. With materials recovery rate of 67%, the annual production capacity of 96.48 tonnes of groundnut paste is expected.

FIG. 1 : GROUNDNUT PASTE PRODUCTION FLOW CHART



4.0 COSTING AND EVALUATION

Costing in monetary values gives the prospective investor an idea of the magnitude of the cost which might be involved. The costing of the chosen model includes the real (physical) cost of the plant, labour, space requirement, services and materials required.

4.1 Fixed Capital Cost

Fixed capital cost for the venture is estimated at ¢6,162,580.00. This includes the production plant acquisition, installation and commissioning, (See Appendix I, Table 1).

4.2 Operation Cost

Operating cost in the first year is estimated at ¢70,021,040.00. This includes cost of raw materials, packaging materials, utilities, factory rent, etc. It must be noted that cost factors used here are based on Accra conditions, (See Appendix 1, Table 2).

4.3 Investment Capital

The initial investment capital needed for the venture to take off is estimated at ¢23,667,790.00 which is the sum of fixed and working capitals.

4.4 Revenue

With the ex-factory price of groundnut paste fixed at ¢1,000.00 per kg. and an annual production target of 96,480 kg of groundnut paste, expected revenue in the first year is ¢96,480,000.00.

5.0 FINANCIAL ANALYSIS

Financial analysis carried out on this operation covers a period of five years. Assumptions made include 10% increase in cost of labour, operating supplies and selling price (ex-factory price) of product annually.

5.1 Income and Expenditure Statement

Appendix II shows the Proforma Income and Expenditure Statement of the operation of the project. The statement shows an increase in expenditure from ¢72,097,720.00 in the first year to ¢104,998,050.00 in the fifth year. This increase is a result of anticipated inflationary trends in the country. Income after tax is expected to increase from ¢13,410,260.00 to ¢19,998,050.00 and Return on Investment from 57% to 84% over the same period.

5.2 Cash Flow Statement

The cash flow statement presented in Appendix III indicates a net cash flow increasing from ¢14,086,510.00 to ¢20,674,300.00 within five years of operation and cumulative net cash flow of ¢86,109,570.00 by the end of the fifth year.

5.3 Discounted Cash Flow Statement

The internal rate of return (IRR) has been used to assess the financial performance of the venture. The IRR is the discount rate which equates the cash inflows and outflows over a period of time and provides an estimate of return to capital investment after recovery of that investment.

An IRR of 61% was obtained for the venture as shown in Appendix IV. This value is higher than the current average interest rate (or opportunity cost of capital) which stands at about 30%. This clearly shows that the venture is financially profitable.

6.0 CONCLUSION

The total capital investment required to establish the plant is ¢23,667,790.00. An Internal Rate of Return of 61% is expected from the operations of the project. On the assumptions made in this guide, it can be concluded that the venture is technically feasible and financially viable.

7.0 RECOMMENDATIONS

It must be emphasized here that this report is only a guide to the economics of a groundnut paste production plant.

It is of utmost importance that the investor carries out a full scale technical and economic feasibility study into the proposed venture, taking into account the use of factor and other costs relevant to existing situations, types of machinery to be used, choice of pricing, etc.

The Food Research Institute can be of great assistance in this regard to any prospective investor who intends to venture into not only groundnut paste production but also processing of other food commodities.

Addresses/Telephone numbers/Location of some recommended manufacturers/suppliers of food processing machinery and equipment are presented in Appendix V.

APPENDIX I

TABLE 1 : FIXED CAPITAL COST

Plant machinery and equipment

Item	Description	Qty	COST (¢'000)
1	Mechanical roaster	1	1,200.00
2	Dehuller	1	550.00
3	Attrition mill	1	950.00
4	Platform weighing scale (210 kg)	1	850.00
5	Heat sealer	2	140.00
6	Weighing scale (10 kg)	2	40.00
7	Aluminium pan	40	400.00
8	Aluminium tray	20	200.00
9	Industrial gas burner with assessories	1	300.00
10	Ancillaries,10%		463.00
	Contingencies, 10%		509.30
	Installation and commissioning, 10%		560.23
	TOTAL		6,162.53

TABLE 2 : RECURRENT COST

	A. OPERATING SUPPLIES	Qty	COST (¢'000)
1	Raw Material (ton)	144.00	43,200.00
2	Packaging material		6,552.00
3	Water		200.00
4	Electricity		1,000.00
5	Gas (fuel)		921.60
6	Laboratory services		600.00
8	Repair & Maintenance, 4% plant & building		48.82
9	Factory annual rent		1,200.00
10	Contingencies, 5%		2,686.12
	TOTAL		56,408.54
	B. HUMAN RESOURCE REQUIREMENT		
	a) Manager	1.00	1,440.00
	b) Production Supervisor	1.00	960.00
	c) Storekeeper (purchases & supplies)	1.00	840.00
	d) Semi–skilled labour	6.00	3,240.00
	e) Skilled labour	4.00	2,880.00
	f) Security personnel	1.00	540.00
	Social security Fund, 12.5%		1,237.50
	Perquisites, 25% total salaries		2,475.00
	TOTAL		13,612.50
	TOTAL ANNUAL OPERATING COST		70,021.04
	WORKING CAPITAL, 25%		17,505.26
	OVERHEADS, 2%		1,400.42
	INVESTMENT CAPITAL		23,667.79
	Note : Raw material price per ton in Accra =		300.00

APPENDIX II

PROFORMA INCOME & EXPENDITURE STATEMENT

A.	EXPENDITURE	YEAR 1 (¢'000)	YEAR 2 (¢'000)	YEAR 3 (¢'000)	YEAR 4 (¢'000)	YEAR 5 (¢'000)
	Production Cost	70021.04	77023.15	84725.46	93198.01	102517.81
	Overheads	1400.42	1470.44	1543.96	1621.16	1702.22
	Depreciation	676.25	676.25	676.25	676.25	676.25
	TOTAL EXPENSES	72097.72	79169.84	86945.68	95495.42	104896.28
B.	INCOME					
	Revenue	96480.00	106,128.00	116,740.80	128,414.88	141,256.37
	Net Income before Tax	24382.28	26958.16	29795.12	32919.46	36360.09
	Income Tax, 45%	10972.03	12131.17	13407.80	14813.76	16362.04
	Income after Tax	13410.26	14826.99	16387.32	18105.70	19998.05
	Return on Investment	56.66	62.65	69.24	76.50	84.49
	Average Return on Investment, % :		69.91			

NOTES :

Depreciation – 10% Plant; 5% Building
Overheads include cost of stationery, postage, insurance, etc.

Expected quantity of product per annum	(kg)	96,480.00	
Selling price of product per kg.	(Cedis)	1,000.00	(Ex–factory Price)

Revenue increases by 10% annually

APPENDIX III

PROJECTED CASH FLOW STATEMENT

CASH INFLOW	YEAR 0 (¢'000)	YEAR 1 (¢'000)	YEAR 2 (¢'000)	YEAR 3 (¢'000)	YEAR 4 (¢'000)	YEAR5
Investment Capital	23667.79					
Income before Tax		24382.28	26958.16	29795.12	32919.46	36360.09
Depreciation		676.25	676.25	676.25	676.25	676.25
Total Cash Inflow	23667.79	25058.54	27634.41	30471.37	33595.71	37036.34
CASH OUTFLOW						
Investment Capital	23667.79					
Income Tax		10972.03	12131.17	13407.80	14813.76	16362.04
Total Cash Outflow	23667.79	10972.03	12131.17	13407.80	14813.76	16362.04
Net Cash Flow	0.00	14086.51	15503.24	17063.57	18781.95	20674.30
Cumulative Net Cash Flow	0.00	14086.51	29589.75	46653.32	65435.27	86109.57

APPENDIX IV

DISCOUNTED CASH FLOW STATEMENT

YEAR	INITIAL INVESTMENT (¢'000)	NET CASH FLOW (¢'000)	DISCOUNT FACTOR AT 61%	PRESENT VALUE 0.61 (¢'000)
0	23667.79			
1		14086.51	0.6211	8749.38
2		15503.24	0.3858	5980.96
3		17063.57	0.2396	4088.77
4		18781.95	0.1488	2795.36
5		20674.30	0.0924	1911.18
	Salvage Value, 50%	3,081.27	0.0574	176.92
	NET PRESENT VALUE		=	23702.56
	NET PRESENT VALUE / INITIAL INVEST		=	1.0015
	INTERNAL RATE OF RETURN		=	61%

APPENDIX V: List of manufacturers/suppliers with addresses

MACHINERY/EQUIPMENT	MANUFACTURER/SUPPLIER
1. Roaster	1. FATECO 2. Food Research Institute 3. Fredo Eng. Ltd.
2. Aspirator	1. Food Research Institute 2. Agbemskod Ecg. Ltd. 3. Fredo Eng. Ltd. 4. FATECO
3. Dehuller	1. Industrial Research Institute 2. Food Research Institute 3. Fredo Eng. Ltd.
4. Attrition Mill	1. FATECO 2. Agrico Ltd.

ADDRESSES

1. FATECO
   P.O. Box 9899
   Accra.
   Tel: 663114
   Location: Agboba (near Kwabenya)

2. Food Research Institute
   P.O. Box M. 20,
   Accra.
   Tel: 777330/774111
   Location: Brox Tito Avenue, Cantonments

3. Fredo Engineering Ltd
   P.O. Box 12286,
   Accra - North
   Location: Nyamekye, Darkuman

4. Industrial Research Institute
   P.O. Box M. 32,
   Accra.
   Tel: 775202
   Location: Airport Residential Area (CSIR Secretariat)

5. Agbemskod Engineering Ltd.,
P.O. Box 1
Kaneshie, Accra
Tel: 665744
Location: Odawna, Near Agbobloshie market

6. Agrico Ltd
P.O. Box 12127,
Accra - North,
Tel: 228260
Location: Industrial Area, North Keneshie