# PREFEASIBILITY STUDY ON SETTING UP GREEN HOUSE FARM FOR TOMATOES 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 **Tomato Green House Farm** in the agro 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 Tomato Green House Farm** 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

This prefeasibility study is on setting up Green House Tomatoes Farm in most suitable part of Nigeria.

Tomato is a very important source of vitamins and minerals that are essential for a healthy diet. In many countries, tomato has become an important cash and industrial crop, and in Nigeria it represents about 18 percent of the average daily consumption of vegetable food in the country.

A green house is a building in which plants are grown. With the emerging Green House Technology, the project can be sited in any part of Nigeria provided there is availability of large farm land for construction of the nursery and warehouse for the storage of the harvest. Similarly, with good farming practice, the green house technology would ensure the availability of tomato all year round.

The installed capacity of the farm is projected at 110 kgs per day production capacity throughout the year assuming a 3 month production cycle annually, at 60% capacity utilization.

The total investment cost is N12,540,440, which could be scaled up or down depending on availability of capital.

#### 1.1 SUMMARY OF TOTAL PROJECT COST

c h i							
S/N	DESCRIPTION	COST	COST TO BE	TOTAL			
		INCURRED	INCURRED				
1	Land & structures	-	5,400,000	5,400,000			
2	Machinery & equipment	-	1,500,000	1,500,000			
3	Office equipment	-	400,400	400,400			
4	Utility equipment	-	400,000	400,000			
5	Vehicle	-	2,200,000	2,200,000			
	Total cost of capital	-	9,900,400	9,900,400			
6	Working capital	-	1,500,000	1,500,000			
7	10% contingency	-	1,140,040	1,140,040			
	Total project cost	-	12,540,440	12,540,440			

#### 1.2 FINANCIAL ACCOUNTING RATIOS ANALYSIS

#### PERFORMANCE RATIOS AVERAGES

(a) Return on Sales =35% (b) Return on Equity =210% (c) Return on Investment =76%

(d) Positive NPV =  $\frac{4}{3}$ 3,501,989

(e) IRR =47% (f) ARR =76%

(g) Payback Period = 1 year and 7 months



#### PART II MARKET ANALYSIS

#### 2.1 INTRODUCTION

Tomatoes are consumed by a big number of people in the country everyday so the market potential is big especially in markets and supermarkets. Introduction of greenhouse farming for production of tomatoes will ensure that the popular vegetable will not only become available throughout the year at affordable prices and increase the incomes of the farmer, but that it will yield sufficient quantity to meet local demand and excess for export.

#### 2.2 MARKET AREA ANALYSIS

Without forgetting that tomato can be grown both as an annual, and also as a perrenial crop, it is worth knowing that tomatoes grown as annuals in Nigeria are planted outdoor on the field, and produce fruit majorly during the dry season. However, tomato grown as perennials has an all year round fruit production which makes it an ideal production practice that can close the impending tomato supply gap. For tomatoes to grow this way, greenhouse farming is the best option. This is so because all plant growth factors can be controlled and maintained at optimum level all year round in greenhouses. It is also possible for crops to mature in a lesser period than when cultivated in open field (futux Agri consult, 2019).

#### 2.3 DEMAND AND SUPPLY ANALYSIS

Following the proposed ban of importation of tomato paste into Nigeria, many questions are begging for answers in the mind of stakeholders operating in the tomato value chain. Nigeria remains the largest importer of tomato with over \$360 million import bill on tomato paste and sauce due to the demand for tomatoes which far outweighs the supply. According to Food Business Africa, the national demand for fresh tomatoes in Nigeria is 3.5 million metric tons, while local farmers that grow this commodity can only produce 1.8 million metric tons. There is thus a 50% production shortfall which needs to be met. Similarly, the CBN, as part of its efforts in encouraging local production, also placed tomato & tomato paste imports on the FX restriction list. We believe this has led to significant investments in the production of the fruit as revealed by NIHORT. On the negative, the move to protect local farmers has led to higher prices due to the huge supply gap which was previously filled by imported tomatoes.

To meet the demand and supply challenges of the tomato vegetable by Nigerians after the implementation of the ban, every stakeholder in the Nigeria tomato value chain would need to adopt a measure that will make tomatoes available not only in correct quantities but also in the right quality, all year round.



#### 2.4 TARGET MARKET ANALYSIS

As noted earlier, tomatoes are consumed by a big number of people in the country every day. The products could be used for both domestic and commercial purposes for the preparation of variety of dishes. Similarly, due to the nature of the product, the entrepreneur(s)/ farmers should target supermarkets, distributors that sales to the public market retailers etc. Although, the demand for the commodity is high, therefore, once available, it could easily be sold.



#### PART III TECHNICAL ANALYSIS

#### 3.1 PROJECT DESCRIPTION

The project involves acquiring and preparation of land, setting up the green house, planting the tomatoes, managing the garden, harvesting the tomatoes when they are ready and marketing the tomatoes. Of course even without probing, it is obvious that the cost implications of greenhouse farming are a challenge to many tomato farmers. However, the cost implications vary depending on whether the farmer chooses to import the structure or construct it locally.

#### 3.2 SUITABLE LOCATION

With the emerging Green House Technology, the project can be sited in any part of Nigeria provided there is availability of large farm land for construction of the nursery and warehouse for the storage of the harvest.

#### 3.3 GREENHOUSE STRUCTURE

A wide range of approaches to protected cultivation are possible; growers can adopt and adjust technologies according to climatic and specific crop requirements. High-tech greenhouses produce high yields but also have high initial costs; naturally ventilated plastic tunnels and greenhouses are a low-cost alternative suitable for growers with limited capital or in regions with fluctuating demand.

#### 3.4 PRODUCTION PROCESS

Tomato nursery is a major prerequisite to produce quality seedlings which forms the base for sustainable tomato production. Tomato seedlings are typically raised in nurseries before they are transplanted to the fields. Tomato nursery management is a significantly expensive venture for many farmers in Nigeria (many of whom are smallholder farmers) and typically have to buy the seedlings from other countries. However, Greenhouse technology offers a better alternative to the open field farming because of the effect of climate change and bacterial blight disease associated with open field tomato production. In addition, the tomatoes produced under greenhouses have a shelf-life of 21 days compared with 14 days for those grown in the open. This is a major advantage in the area of increased production and postharvest losses reduction because about 45% of the tomatoes produced locally in Nigeria are wasted due to low shelf life.

#### 3.5 PRODUCTION CAPACITY

The proposed capacity for this project is based on production capacity of 110 kgs per day throughout the year assuming a 3 month production cycle annually, at 60% capacity utilization.



#### 3.6 CRITICAL SUCCESS FACTOR

Greenhouse production offers great potential:

- Increase productivity by unit of land area and extend the duration of the cropping season.
- Offset the effects of climate change by protecting crops against variable climatic phenomena.
- Improve pest and disease control with reduced use of chemical pesticides and more widespread adoption of biological control.
- Provide control over production planning to meet consumer demand with higher-quality and safer products.

The following are critical factor to consider;

- 1. Plant material: species, cultivars, propagation, and diversification.
- 2. Technology: greenhouse design, covering materials, climate control, irrigation, fertigation, soilless culture.
- 3. Cultivation practices: plant density, training and pruning, plant nutrition, weed control.
- 4. IPM: biological control and safe application of pesticides in respect of international and national regulations.
- 5. Production economics, quality norms and standards, organic horticulture.



#### 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. The installed production capacity is 110 kgs per day throughout the year assuming a 3 month production cycle annually, at 60% capacity utilization.
- 4. The proposed capacity utilization are 60% in the first year of commercial production, 70%, 80% in the 2<sup>nd</sup> and 3<sup>rd</sup> year respectively and 90% in the 4<sup>th</sup> and 5<sup>th</sup> 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 33,501,989

#### 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 **47%.** 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 **76%**.

#### 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 Cost	Total
	LAND & STRUCTURES			
1	Land Acquisition / Lease of 1 Acre	1	400,000	400,000
2	Store house	1	500,000	500,000
3	Construction of Green house	1	2,500,000	2,500,000
4	Perimeter fence	1	2,000,000	2,000,000
	Sub total	4	5,400,000	5,400,000
	MACHINERY & EQUIPMENT			
5	Farm equipments	1	1,500,000	1,500,000
	Sub total	2	1,500,000	1,500,000
	OFFICE EQUIPMENT			
7	Office equipment	1	50,400	50,400
8	Cold room	1	350,000	350,000
	Sub total	2	400,400	400,400
	UTILITY EQUIPMENT			
9	Farm borehole and overhead tanks	1	400,000	400,000
	Sub total	1	400,000	400,000
	VEHICLE			
	Delivery truck	1	2,200,000	2,200,000
	Sub total	1	2,200,000	2,200,000
	Total cost of capital		9,900,400	9,900,400
11	Working capital		1,500,000	1,500,000
12	10% contingency		1,140,040	1,140,040
	Total project cost		12,540,440	12,540,440



# APPENDIX ESTIMATION OF WORKING CAPITAL REQUIREMENT

Year of Commercial Operation	3 Months
% Capacity Utilization (Inventory)	60%
2 weeks stock of raw material	1,250,000
3 Days stock of finished products	-
Work in Progress	-
Bank/ Cash (5% sales of the products)	250,000
Working capital	1,500,000

## APPENDIX FINANCING PLAN

DESCRIPTION	EXISTING	PROPOSED	TOTAL
Equity	4,540,440		4,540,440
Term loan from	-	8,000,000	8,000,000
Total project cost	4,540,440	8,000,000	12,540,440
% Contribution	33.5%	68.5%	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	REPAYMENT	INTEREST	TOTAL YEAR
	BALANCE		DUE	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 (1<sup>ST</sup> OPERATIONAL YEAR) N'000

POSITION	No	Unit Scale	Scale/	Scale / Year
			Month	
DIRECT LABOUR				
Factory Manager	1	60	60	720
Production Manager	1	60	60	720
Unskilled labour	6	30	180	3,120
Sub total	8	150	300	4,560
INDIRECT LABOUR				
Accounts/ Admin	1	50	50	600
Marketing Officer	2	50	100	1,200
Sub total	3	100	150	1,800
Total on staff (1 <sup>st</sup> year)	11	250	350	6,360

# APPENDIX VI ESTIMATE OF ANNUAL DEPRECIATION ALLOWANCE

N'

ITEMS	INITIAL VALUE	DEPRECIATION (20%)
Machinery and Equipments	1,500,000	300,000
Utility Equipments	400,400	80,080
Office equipment	400,000	80,000
Vehicle	2,200,000	440,000
TOTAL	4,500,400	900,080

# APPENDIX VII ESTIMATION OF ADMINISTRATIVE / OVERHEAD EXPENSES N'000

COST ITEM	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Selling and Distribution	480	504	528	554	554
Utilities	312	327.6	343.2	360	360
Miscellaneous	40	44	48.4	53.2	53.2
Diesel	1,780	1,869	1,958	2,056	2,056
TOTAL	2,596	2,725.8	2,855.6	2,998.38	2,998.38



## APPENDIX VIII ESTIMATION OF PRODUCTION AND OPERATION COSTS

Cost Item	Units	@	Qty/qtr	Pdn cost/ qtr	Pdn cost/ yr
Direct Costs					
Seedlings	Pkts	600	1,000	600,000	2,400,000
Fertilizers	Sacks	1,500	20	30,000	120,000
Pesticides	Bottles	4,200	70	294,000	1,176,000
Sub-total		6,300		924,000	3,696,000

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					
Tomatoes (kg)	40,000	44,000	48,000	52,800	52,800
Total output	40,000	44,000	48,000	52,800	52,800
2. Cost of Production	N'	N'	N'	N'	N'
Tomatoes @ N92.4/ kg	3,696,000	4,065,600	4,435,200	4,878,720	4,878,720
Total cost of production	3,696,000	4,065,600	4,435,200	4,878,720	4,878,720
3. SALES					
Tomatoes @ N600/ kg	24,000,000	26,400,000	28,800,000	31,680,000	31,680,000
TOTAL SALES/ TURNOVER	24,000,000	26,400,000	28,800,000	31,680,000	31,680,000



# 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	24,000,000	26,400,000	28,800,000	31,680,000	31,680,000
VAT @ 5%	1,200,000	1,320,000	1,440,000	1,584,000	1,584,000
Net Revenue	22,800,000	25,080,000	27,360,000	30,096,000	30,096,000
2. OPERATION COST					
Cost of Raw materials consumed	3,696,000	4,065,600	4,435,200	4,878,720	4,878,720
Staff and labour	6,360,000	6,996,000	7,632,000	8,395,000	8,395,000
Admin. & Overhead Expenses	2,596,000	2,725,800	2,855,600	2,998,380	2,998,380
Depreciation	900,080	900,080	900,080	900,080	900,080
Total Operating Cost	13,552,080	14,687,480	15,822,880	17,172,180	17,172,180
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)	14,512,080	15,455,480	16,398,880	17,556,180	17,364,180
Profit Before Tax	8,287,920	9,624,520	10,961,120	12,539,820	12,731,820
Tax @ 12%	994,550	1,154,942	1,315,334	1,504,778	1,527,818
Profit after tax (NET PROFIT)	7,293,370	8,469,578	9,645,786	11,035,042	11,204,002
% Return on Sales	0.32	0.34	0.35	0.37	0.37
% Return on Equity	1.61	1.87	2.12	2.43	2.47
% Return on Investment	0.58	0.67	0.77	0.88	0.89



APPENDIX XI
FORECAST HIGH RATE AND LOW RATE COMPUTATION

Year	C/F	DF 12%	NPV	
	N'		N'	
0	(12,540440)	1	(12,540440)	
1	7,293,370	0.893	6512979	
2	8,469,578	0.797	6750253	
3	9,645,786	0.712	6867799	
4	11,035,042	0.636	7018286	
5	11,204,002	0.567	6352669	
<b>Total Profit</b>	47,647,778		33,501,989	
Average Profit	9,529,556			

Year	C/F	DF 60%	NPV	
	N'		N'	
0	(12,540440)	1	(12,540440)	
1	7,293,370	0.625	4,558,356	
2	8,469,578	0.3906	3,308,217	
3	9,645,786	0.2441	2,354,536	
4	11,035,042	0.1526	1,683,947	
5	11,204,002	0.0954	1,068,862	
<b>Total Profit</b>	47,647,778		12,973,919	
Average Profit	9,529,556			



## APPENDIX XII FORECAST IRR AND ARR COMPUTATION

IRR = 
$$a + (A)*(b-a)$$
A+B

Where

a = 12%

b= 60%

A = 33,501,989

B= 12,973,919

47%

ARR = <u>Estimated Average Profit</u> x 100

Estimated initial investment

12,540440

76%



## APPENDIX XIII CASH FLOW PROJECTION

Year of Comm. Production	Year o	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'
Équity Capital	4,540,440	-	-	-	-	-
Term Loan	8,000,000	-	-	-	-	-
Gross Revenue	-	12,540,440	12,540,440	12,540,440	12,540,440	12,540,440
Total Receipts	12,540,440	12,540,440	12,540,440	12,540,440	12,540,440	12,540,440
B) CASH PAYMENTS						
Capital Payment						
Machinery & Equipments	1,500,000	-	-	-	-	-
Utility Equipments	400,400	-	-	-	-	-
Office Equipments	400,000	-	-	-	-	-
Vehicle	2,200,000	-	-	-	-	-
TOTAL	4,500,400	-	-	-	-	-
(ii) Operating Expenses						
Depreciation	-	900,080	900,080	900,080	900,080	900,080
Change in working capital	8,040,040	12,652,000	13,787,400	14,922,800	16,272,100	16,272,100
Sub total	8,040,040	13,552,080	14,687,480	15,822,880	17,172,180	17,172,180
(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	192,000
Value Added Tax	-	1,200,000	1,320,000	1,440,000	1,584,000	1,584,000
Corporate Tax	-	994,550	1,154,942	1,315,334	1,504,778	1,527,818
Sub total	-	3,154,550	3,242,942	3,331,334	3,472,778	3,303,818
Total cash payment (ii)-(iii)	8,040,040	10,397,530	11,444,538	12,491,546	13,699,402	13,868,362
Net cash flow c/f	8,040,040	10,397,530	11,444,538	12,491,546	13,699,402	13,868,362



## APPENDIX XIV BALANCE SHEET PROJECTION

Year of comm. Operation	Year o	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	1,500,000	-	-	-	-	-
Utility Equipments	400,400					
Office Equipments	400,000	-	-	-	-	-
Vehicle	2,200,000	-	-	-	-	-
Value at Acquisition		4,500,400	4,500,400	4,500,400	4,500,400	4,500,400
Less Cumulated Depreciation	-	900,080	1,800,160	2,700,240	3,600,320	4,500,400
Net fixed assets	4,500,400	3,600,320	2,700,240	1,800,160	900,080	0
(ii)Current Assets/ liability						
Stock of Raw Materials	1,500,000	24,699,016	33,939,059	37,439,439	39,719,292	42,858,561
Debtors / prepayment	-	1,453,000	2,098,000	3,308,000	4,139,000	5,653,000
Bank and Cash Balances	6,540,040	150,024	160,031	170,539	180,674	180,741
Creditor / accruals	-	(9,074,000)	(11,039,000)	(13,947,000)	(15,013,000)	(18,785,000)
Company Tax	-	(994,550)	(1,154,942)	(1,315,334)	(1,504,778)	(1,527,818)
Net current assets	8,040,040	16,233,490	24,003,148	25,655,644	27,521,188	28,379,484
TOTAL NET ASSETS	12,540,440	19,833,810	26,703,388	27,455,804	28,421,268	28,379,484
(ii) <u>FINANCED BY</u>						
Equity Capital	4,540,440	4,540,440	4,540,440	4,540,440	4,540,440	4,540,440
P&L	-	7,293,370	8,469,578	9,645,786	11,035,042	11,204,002
Retained Profit	-	-	7,293,370	8,469,578	9,645,786	11,035,042
SHAREHOLDERS FUND	4,540,440	11,833,810	20,303,388	22,655,804	25,221,268	26,779,484
Long Term Loan	8,000,000	8,000,000	6,400,000	4,800,000	3,200,000	1,600,000
TOTAL EQUITY & LIABILITY	12,540,440	19,833,810	26,703,388	27,455,804	28,421,268	28,379,484

