Design and Construction of a Rice Threshing Machine

By

Engr. Adamu Hassan Abubakar

Engr. Mohammed Bashir

(Advanced Manufacturing Technology Development Institute (AMTDI) Jalingo)

Engr. Dr. Benjamin Ile Attah (Principal Investigator)

(African University of Science and Technology AUST Abuja)

Submitted

To

The Grant Committee,
NASENI Research Commercialization Grant (NRCG) Abuja Nigeria

Outline of Deck

- Research Commercialization
- INTRODUCTION
- Business Overview
- Market Gap and Opportunity
- Key Competitors
- Financial Plan
- Risk Analysis and Mitigation
- General Grant Summary
- Conclusion

Research Commercialization…..

INTRODUCTION

- This business plan outlines the design, production, and commercialization of a high-performance rice threshing machine tailored for small and medium-scale farmers in Nigeria.
- The innovation bridges the gap between imported high-cost threshers and inefficient manual processing, offering a locally produced, durable, and efficient solution.
- The venture promotes agricultural productivity, job creation, and national food security, with a projected ROI of 35% within 18 months.

Business Overview

- The proposed business will operate as a local agricultural technology and engineering enterprise **focusing on the production of cost-effective mechanized farm tools**.
- The company's mission is to empower smallholder farmers by providing accessible technologies that enhance efficiency and minimize post-harvest losses.
- Strategic partnerships with local governments, cooperatives, and agricultural development agencies will ensure rapid adoption and scalability.

Market Gap and Opportunity

- Nigeria is among Africa's leading rice producers, with annual consumption exceeding 7 million metric tons.
- However, the nation's post-harvest losses remain high due to manual threshing methods and limited access to affordable mechanization.
- Imported threshers are expensive and difficult to maintain, creating a large demand for locally fabricated alternatives.
- With over 12 million smallholder rice farmers and expanding mechanization initiatives by the Federal Government, the market potential for local threshing machines is valued above ₦60 billion annually.

Key Competitors for Rice threshing machine manufacturing

Factors	Competitor 1	Competitor 2	Competitor 3	This project
Name of Competing Product	Rice thresher	Rice thresher	Rice thresher	Rice thresher
Name of Competitor Organization	Hanchuan Machine Tool Group Co., Ltd.	Zhengzhou Hanchuang Machinery Co., Ltd.	Olatech metal fab services ltd	This project
Price of the individual's/ company's product/ service(₦)	$750	$800	₦2,950,000	₦1,061,312.50
Region of Competitor Operations	China	China	Kwara	Taraba

Product and Services Envisaged from the Project

Product name	Production quantity (units)	Selling quantity	Wholesale price of product (₦)	Annual sales (₦)
1ST Year Rice thresher production and sales	200	150	1,061,312.50	159,196,875
2ND Year thresher production and sales	300	200		212,262,500
3RD Year thresher production and sales	400	250		265,328,125
4TH Year thresher production and sales	500	360		382,072,500
TOATAL				647,772,084.375

Financial Plan for Unit of the Thresher

Item	Description	Amount (₦)	Remarks
Material Cost (MC)	Locally sourced steel, bearings,excluding (diesel engine)	570,500.00	Base cost
Contingency (15%)	Fabrication variation allowance	85,575.00	Safety margin
Direct Labour Cost (30%)	Fabrication and assembly	171,150.00	Skilled labour
Intellectual Input (6%)	Engineering design and supervision	34,230.00	Technical input
Production Cost (PC)	Subtotal before overhead	861,455.00	Subtotal
Actual Production Cost (APC)	Including 12.5% overhead	964,829.60	Factory cost
Taxes (VAT + WHT)	Statutory deductions (5% + 5%)	96,482.90	Government levy
Selling Price	Final market price per unit	1,061,312.50	Retail value

Designed and Fabricated Project

Risk Analysis and Mitigation

- ✓ Potential risks include raw material price fluctuations, market entry of foreign competitors, and supply chain disruptions.
- ✓ Mitigation strategies involve establishing long-term supplier contracts, continuous innovation, and leveraging local partnerships for steady material supply.
- ✓ Comprehensive maintenance support and user training will ensure customer retention and reduce post-sale risks.

SWOT Analysis

Strength	Weaknesses
Service will be cheaper	Lack of Capital
Quality goods to provide demand	funding
Opportunities Job opportunities	Threats Insecurity
Highly profitable	Natural Disaster

Market Forces

General Grant Summary

1. Infrastructure Development

Item	Description	Cost (₦)
Workshop Construction	Blockwork, slab, plastering, etc.	₦4,428,000.00
Roofing Installation	Mono-pitch aluminium roof	₦6,847,452.00
Electrical & Plumbing Setup	Wiring, lighting, ventilation, etc.	₦1,500,000.00
Office & Washroom Finishing	Doors, windows, fittings	₦1,000,000.00
Subtotal		₦13,775,452.00

2. Equipment Procurement

Item	Description	Cost (₦)
Fabrication & Machining Tools	Lathe, milling, bending, welding	₦24,820,000.00
Power & Utilities	Generator, Compressor, Hydraulic set	₦10,600,000.00
Assembly & Finishing Tools	Drills, racks, painting tools	₦1,580,000.00
Subtotal		₦37,000,000.00

3. Initial Production Setup

Item	Description	Cost (₦)
Raw Materials (For 10 units)	Steel, bearings, etc.	₦5,705,000.00
Labour & Technical Input	Fabrication, design, supervision	₦2,111,500.00
Contingency & Overhead	15% contingency + 12.5% overhead	₦1,650,000.00
Subtotal		₦9,466,500.00

4. Marketing & Outreach

Item	Description	Cost (₦)
Field Demonstrations	Transport, setup, logistics	₦1,500,000.00
Digital Campaigns	Website, social media, ads	₦1,000,000.00
Training & Support Materials	Manuals, workshops, spare parts	₦1,500,000.00
Subtotal		₦4,000,000.00

5. Personnel & Operations

Item	Description	Cost (₦)
Staff Salaries (Year 1)	2 Technical + 1 Admin + 2 Assistants	₦4,500,000.00
Management & Consulting	Engineering, business advisory	₦2,000,000.00
Legal & Regulatory Fees	Business registration, taxes	₦1,000,000.00
Subtotal		₦7,500,000.00

6. Total Grant Budget Summary

Category	Cost (₦)
Infrastructure	₦13,775,452.00
Equipment	₦37,000,000.00
Production	₦9,466,500.00
Marketing	₦4,000,000.00
Personnel & Operations	₦7,500,000.00
Grand Total	₦71,741,952.00

Conclusion

- The Rice Threshing Machine business presents a sustainable and profitable opportunity in Nigeria's agricultural mechanization industry.
- It combines technical feasibility, economic viability, and strong social impact.
- The proposed model ensures affordability, job creation, and enhanced productivity for rice farmers.
- Investor participation will accelerate national agricultural modernization and contribute to long-term economic growth.