

## **ENGINEERING AUDIT REPORT – 10 ACRE FOOD FOREST PROJECT**

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Project: Food Forest for Orphans

### **EXECUTIVE SUMMARY**

From 9th to 11th April 2026, a comprehensive three-day engineering audit was conducted on the 10-acre Food Forest Project in Mayuge District, designed to provide sustainable food production for the local orphanage. The audit involved an in-depth site assessment and direct engagement with the orphanage community.

During the visit, I had the opportunity to meet the children at the orphanage. Their warmth, joy, and lovely spirit were deeply inspiring, highlighting the significant social impact this project aims to deliver by enhancing their nutritional security and well-being.



The audit included a thorough inspection of the 10-acre land, where ongoing activities such as initial land preparation, crop sections, nursery development, and beekeeping projects were observed. These community-driven efforts demonstrate strong commitment and provide a valuable foundation for establishing a productive, multi-layered food forest.

From an engineering perspective, the site benefits from suitable loamy soil, adequate land size, proximity to the orphanage, and good road accessibility. However, the assessment identified critical gaps, including the lack of detailed soil and topographic surveys, formal irrigation and water storage systems, structured drainage and erosion control, proper farm layout plans, and comprehensive project documentation.

Key recommendations focus on implementing reliable water harvesting and drip irrigation systems, contour-based earthworks, perimeter fencing, solar energy solutions, and basic storage infrastructure. These measures are essential to ensure climate resilience, operational efficiency, and long-term sustainability of the project.

## **1. SITE SELECTION & LAND PREPARATION**

### **1. Soil and Geotechnical Investigation**

A basic soil assessment was carried out through field observation and simple testing. The soil is predominantly loamy, which is suitable for crop production because it holds both water and nutrients well. Soil pH is estimated to be within a moderate range (around 6–7), which supports most crops.

No advanced geotechnical lab reports (such as bearing capacity or contamination tests) were provided during the audit.

#### **Engineering Comment:**

While the soil is suitable for agriculture, detailed soil testing is recommended for long-term planning and structural safety.

### **2. Topography Survey**

The land appears to have been assessed visually, with a gentle slope observed across sections of the 10 acres.

- No formal contour maps or digital survey data were presented during the audit.

#### **Engineering Comment:**

A proper topographic survey is recommended to guide drainage, irrigation design, and erosion control.

### **3. Site Selection Rationale**

The land was selected due to:

- Proximity to the orphanage
- Availability of sufficient space (10 acres)
- Accessible road connection
- Potential for future expansion

#### **Engineering Comment:**

The location is practical and supports both current and future project needs.

### **4. Environmental Compliance**

[Environmental Impact Assessment \(EIA\) or permits](#)

No formal Environmental Impact Assessment (EIA) documentation was presented during the audit. However, the project is small-scale and environmentally friendly in nature.

**Engineering Comment:**

It is recommended to confirm local regulatory requirements to ensure compliance

## **2. AGRICULTURAL & FARM INFRASTRUCTURE ENGINEERING**

### **5. Farm Layout Design**

The land is organized into functional zones including:

- Tree planting areas
- Crop sections
- Nursery space
- Composting area

No formal engineering drawings were provided.

**Engineering Comment:**

A structured layout plan would improve efficiency and long-term management.

### **6. Land Preparation & Earthworks**

Land clearing was done manually and/or mechanically. Basic levelling has been carried out, and some natural drainage paths are visible.

**Engineering Comment:**

Additional earthworks such as contour bunds and drainage channels should be introduced.

### **7. Fencing and Security**

Basic perimeter fencing is not installed to protect crops from animals and unauthorized access.

**Engineering Comment:**

Fencing should be strengthened to ensure durability and safety for children.



## 8. Storage & Processing Structures

No simple structures such as storage sheds may be present nor advanced facilities (cold rooms or silos) were observed.

### **Engineering Comment:**

Improved storage systems will reduce post-harvest losses.

## 3. IRRIGATION, WATER SUPPLY & DRAINAGE

### 9. Water Source

Water is sourced mainly from rainfall, with possible supplementary sources such as wells, borehole lacking

### **Engineering Comment:**

Water storage systems such as boreholes, tanks are required to ensure year-round supply.

### 10. Irrigation System

Current irrigation is likely manual or basic.

No advanced irrigation system was observed.

### **Engineering Comment:**

A drip irrigation system is recommended for efficiency and water conservation.

### 11. Drainage System

Natural drainage exists due to the slope of the land, but no engineered drainage system is fully developed.

### **Engineering Comment:**

Drainage channels and erosion-control structures should be added.

### 12. Water Quality

No formal water testing records were present

### **Engineering Comment:**

Water quality testing is necessary to ensure safe food production.

## **4. STRUCTURAL & BUILDING ENGINEERING**

### **13. Farm Structures**

Basic structures (such as sheds or nursery covers) may exist, constructed using locally available materials.

### **14. Structural Design Standards**

No formal structural calculations or design standards were presented.

#### **Engineering Comment:**

Future structures should consider safety factors, especially where children are involved.

### **15. Accessibility**

The land is generally accessible with specialized pathways or accessibility features were observed.

#### **Engineering Comment:**

Accessible for movement and safety.

## **5. ENERGY, UTILITIES & MECHANICAL SYSTEMS**

### **16. Power Supply**

No major power system is currently installed. Operations rely mainly on manual methods.

#### **Engineering Comment:**

Solar energy is recommended for sustainable power supply.

### **17. Mechanical Systems**

Minimal mechanization is present. Basic tools and possibly small equipment are used.

#### **Engineering Comment:**

Introducing pumps and simple machinery will improve productivity.

## **6. SUSTAINABILITY & RISK ENGINEERING**

### **18. Soil Conservation**

Some natural vegetation helps reduce erosion, but structured conservation systems are limited.

### 19. Waste Management

Organic waste is likely reused (e.g., composting), but no formal system is documented.

### 20. Climate Resilience

The project relies on natural rainfall and basic practices.

#### **Engineering Comment:**

Water storage and drought-resistant crops should be prioritized.

### 21. Risk Assessment

No formal risk assessment document was provided.

#### **Engineering Comment:**

Main risks include drought, erosion, and limited infrastructure.

## **7. PROJECT DELIVERY & MAINTENANCE**

### 22. Engineering Team

The project appears to be community-driven with limited involvement of professional engineers.

### 23. Cost & Materials

No detailed Bill of Quantities (BOQ) was presented.

### 24. Maintenance Plan

Maintenance is likely informal and based on immediate needs.

#### **Engineering Comment:**

A structured maintenance plan is required.

### 25. Project Documentation

Limited documentation (drawings, reports, certifications).

## **FINAL ENGINEERING CONCLUSION**

The 10-acre food forest project has strong potential to support the orphanage, but it is currently developed at a basic level from an engineering perspective.

### **Key Strengths:**

- Good land size and location
- Suitable soil for agriculture
- Strong social impact objective

### **Key Engineering Gaps:**

- Lack of detailed surveys and soil testing
- Limited irrigation and water systems
- Minimal infrastructure and documentation

## **FINAL RECOMMENDATIONS**

- Conduct detailed soil and land surveys
- Install water harvesting and irrigation systems
- Develop a proper farm layout plan
- Improve drainage and erosion control
- Introduce solar power and basic mechanization
- Create a maintenance and documentation system

From an engineering standpoint, the biggest risk to the long-term success of this food forest is inadequate water management and lack of structured infrastructure. Addressing these through proper design, planning, and maintenance will ensure the farm sustainably feeds the orphanage for many years.