Detailed Project Report on ***"Plant Tissue Culture Laboratory for Banana (G9) & Bamboo Seedlings."***

Client: ABC Genetics

Location: Satara, Maharashtra, India

Background: The proposed project involves establishing a Plant Tissue Culture Laboratory for Banana (G9) and Bamboo seedlings under ABC Genetics, promoted by Dr. XYZ, at Satara, Maharashtra. The laboratory will be designed as a commercial-scale, DBT–NCS–TCP accredited facility with an annual production capacity of 1.5 million plants, catering to farmers, government schemes, and institutional buyers. Report prepared for: Potential Financial Institutions / Investors, DBT–NCS–TCP Accreditation Authorities, and Government Agencies / Scheme Authorities.

Prepared by: Temkars Agri-Tech & Geospatial Consultancy, Pune

Email: contact@temkars.in Contact: +91 9028541024 www.temkars.in

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"Detailed Project Report (DPR) on Plant Tissue Culture Laboratory for Banana (G9) & Bamboo Seedlings"

1.0 Executive Summary

The proposed project involves establishing a Plant Tissue Culture Laboratory for Banana (G9) and Bamboo seedlings under ABC Genetics, promoted by Dr. XYZ, at Satara, Maharashtra. The laboratory will be designed as a commercial-scale, DBT–NCS–TCP accredited facility with an annual production capacity of 1.5 million plants, catering to farmers, government schemes, and institutional buyers.

The project integrates modern tissue culture techniques, greenhouse hardening, and quality assurance protocols to ensure the production of disease-free, high-yielding planting material. It aligns with the National Bamboo Mission and regional demand for G9 bananas, contributing to agri-economic growth, employment generation, and environmental sustainability.

1.1 Project Objectives

The project aims to:

1. Establish a high-tech tissue culture laboratory for commercial propagation of banana and bamboo seedlings.
2. Achieve DBT–NCS–TCP accreditation, ensuring certified and quality-assured planting material.
3. Provide disease-free, genetically uniform plantlets to farmers, FPOs, and government programs.
4. Implement environmentally sustainable operations with efficient energy, water, and waste management systems.
5. Promote skill development and employment opportunities in the biotechnology and horticulture sectors.

1.2 Project Scope & Components

Component	Key Features	Capacity / Area
Media Preparation Room	Equipped with autoclaves, pH meters, analytical balances, magnetic stirrers	500 sq ft

Inoculation Room	Laminar Air Flow cabinets, sterile benches	400 sq ft
Growth Room	Controlled LED lighting, HVAC, environmental sensors	1,000 sq ft
Primary Hardening Greenhouse	Polyhouse with misting and shading systems	10,000 sq ft
Secondary Hardening Greenhouse	Polyhouse with acclimatization facilities	10,000 sq ft
Production Capacity	Annual output of banana & bamboo plants	1.5 million plants/year
Quality Assurance	QC lab, virus indexing, SOP adherence	Integrated into lab workflow
Accreditation	DBT–NCS–TCP	Timeline aligned with trial production

1.3 Technical Feasibility

The laboratory will adopt proven tissue culture protocols for banana (G9) and bamboo, ensuring:

- Contamination-free production through aseptic techniques.
- Controlled growth environment with LED lighting, temperature, and humidity regulation.
- High survival rates in primary and secondary hardening greenhouses.
- Traceability and SOP-based operations for quality assurance and accreditation compliance.

Technical Highlights Table:

Feature	Benefit
Autoclaves & LAF Cabinets	Ensure aseptic culture
LED Growth Rooms	Optimized plant growth & energy efficiency
Greenhouse Hardening	Gradual acclimatization for high survival
SOP Documentation	Enables DBT–NCS–TCP accreditation

Batch Tracking	Quality control & traceability

1.4 Accreditation Readiness (DBT–NCS–TCP)

The facility is designed for full compliance with DBT–NCS–TCP guidelines, including:

- Segregated sterile zones (media prep, inoculation, growth)
- Adequate qualified manpower (botanists, lab technicians, greenhouse staff)
- SOP implementation, QC monitoring, and virus indexing
- Record keeping and batch-wise traceability

Accreditation Timeline (Indicative):

Stage	Duration	Key Deliverable
SOP & Lab Setup	Months 1–6	Trial batches ready
Application Submission	Month 7	DBT online submission
Inspection & Compliance	Months 8–11	Corrective actions implemented
Accreditation Approval	Month 12	DBT–NCS–TCP certified

1.5 Financial Summary

The project cost and financial viability are summarized as:

Capital Investment Table

Component	Cost (₹ Lakhs)
Civil Works & Land Development	75
Laboratory Setup & Equipment	135
Greenhouses & Hardening	45
Utilities & Miscellaneous	15
Pre-operative & Accreditation Costs	20
Total Project Cost	250

Funding Pattern Table

Source	Amount (₹ Lakhs)	Share (%)
Promoter Equity	100	40
Institutional Loan	150	60
Total	250	100

Projected Annual Operational Cost & Revenue

Parameter	Annual Estimate (₹ Lakhs)
Operational Expenses	190
Revenue (1.5 million plants)	290
EBITDA	100
Break-even	3.5–4 years

1.6 Production & Market Highlights

- Annual Production: 1.5 million plants (Banana 60–65%, Bamboo 35–40%)
- Lab-to-Land Timeline: 6–8 months depending on crop
- Target Markets: Farmers, FPOs, institutional buyers, and government programs
- Batch Management: Staggered monthly production cycles to ensure consistent supply

Lab-to-Land Duration Table

Crop	Duration (Months)
Banana (G9)	6–7
Bamboo	7–8

1.7 Project Benefits

Economic, Social, Environmental & Strategic Benefits Table

Type	Benefits
Economic	Revenue generation, employment, local supplier development
Social	Farmer empowerment, skill development, support to FPOs & govt programs

Environmental	Sustainable plant production, reduced disease spread, efficient resource use
Technological	Standardized protocols, accreditation-ready, potential for R&D
Strategic	Market proximity, scalability, phased risk mitigation

1.8 Conclusion

The Plant Tissue Culture Lab project is:

- Technically viable – fully equipped lab and SOP-compliant processes.
- Financially viable – robust revenue, positive EBITDA, and early break-even.
- Accreditation-ready – DBT–NCS–TCP compliance built into design and operations.
- Socially and environmentally beneficial – employment, skill development, sustainable plant production.

Recommendation: Proceed with phased implementation and early accreditation to establish a model tissue culture facility in Maharashtra.

2.0 Introduction

2.1 Background of Plant Tissue Culture in India