EAST WEST UNIVERSITY

Green Pack – Eco-Friendly Packaging Solutions

Project Report

Course Title: Engineering Project Management

Courser Code: EEE 399

Semester: Summer 2025

Section: 01

Submitted By:

Niaz Morshed Razon ID: 2022-2-80-008

Submitted to:

Mohammed Masud Karim

Adjunct Professor

Department of Electrical and Electronic Engineering

East West University

1st September 2025

Contents

1. Executive Summary

Green-Pack is a Dhaka-based startup dedicated to delivering eco-friendly packaging solutions, offering biodegradable, compostable, and recyclable products for food service, retail, and e-commerce sectors in Bangladesh. The venture addresses the pressing need to reduce plastic pollution in a country where millions of tons of waste are generated annually, exacerbated by recent regulations banning 17 types of single-use plastic products, containers, and packaging. Green-Pack aims to capitalize on the growing demand for sustainable packaging while supporting businesses in meeting environmental compliance and consumer expectations.

What: Green-Pack will produce fiber-molded takeaway boxes, compostable cups, and paper mailers, with customizable branding options. These products are 100% biodegradable, designed to minimize environmental impact while maintaining functionality.

Why: Bangladesh faces a severe plastic pollution crisis, with single-use plastics banned since 2002 and stricter measures implemented in 2025. Businesses, particularly in urban centers, are under pressure to adopt sustainable alternatives to comply with regulations and attract eco-conscious customers. Green-Pack offers cost-competitive solutions that align with national goals to recycle 50% of plastic waste by 2025. The sustainable packaging market in Bangladesh is projected to generate BDT 9,118.32 million (BDT 759.86 million) in 2025 for bags and containers, with significant growth potential. Green-Pack contributes to environmental sustainability, economic growth, and job creation.

When: Full operations will commence on January 1, 2026, with pilot production starting in Q4 2025 to ensure process reliability and early customer contracts.

Who: Stakeholders include the founder (entrepreneur), an initial team of 10-15 employees (production, sales, administration), local suppliers of plant-fiber and paper pulp, and target customers such as supermarkets, restaurants, cloud kitchens, and e-commerce sellers in Dhaka and Chattogram. Investors (equity and bank loans) will fund the startup phase.

How: The business will roll out in phases: licensing, facility setup, pilot production, and market launch. Operations will be based in a leased facility in Dhaka's industrial zone, leveraging local sourcing for cost efficiency. Funding includes BDT 7,200,000 in equity and BDT 4,800,000 in bank loans. Revenue will be driven by B2B sales, focusing on customization and competitive pricing. The project anticipates a payback period of 13 months and a positive NPV of over BDT 28,809,240 over five years, ensuring profitability and sustainability.

This summary positions Green-Pack as a leader in Bangladesh's eco-packaging sector, aligning economic viability with environmental responsibility in a regulatory-driven market.

2. Project Details

Project Name: ***Green-Pack – Eco-Friendly Packaging Solutions.***

USP of Your Business: Green-Pack offers 100% biodegradable packaging that is cost-competitive, customizable with 1- to 3-color branding, and delivers fast lead times tailored to Bangladeshi businesses. Unlike plastic-based competitors, our products use locally sourced plant-fiber and paper pulp, ensuring compliance with Bangladesh's plastic ban regulations while reducing lifecycle environmental impact. This provides a total cost of ownership advantage (price + lead time + customization + compliance), appealing to businesses transitioning to sustainable practices.

Information about the Product or Service: Green-Pack will manufacture:

- Fiber-molded takeaway boxes (40% of product mix) for food service.
- Compostable cups (30%) for beverages.
- Paper mailers (30%) for e-commerce and retail. Services include custom sizing and printing for brand visibility. Products are made from plant-fiber and recycled paper pulp, certified biodegradable per international standards like ASTM D6400 (adapted for local compliance). They undergo rigorous testing for strength, leakage resistance, and compostability to meet food safety and environmental regulations. The product mix is flexible, allowing adjustments based on market demand.

Location of the Project: The production facility will be located in an industrial zone in Dhaka, Bangladesh, such as Savar or Gazipur, chosen for proximity to raw material suppliers, skilled labor, and urban markets. Dhaka's logistics infrastructure supports efficient distribution to Chattogram and other cities, while local sourcing reduces costs and aligns with national sustainability goals.

Probable Start Date: January 1, 2026, with pilot runs in Q4 2025 to test production and secure initial clients.

Project Snapshot:

Item	Value
Project Name	Green-Pack – Eco Friendly Packaging Solutions
Unique Selling Proposition (USP)	100% biodegradable; cost-competitive; customizable branding; fast lead times.
Products & Services	Fiber-molded takeaway boxes, compostable cups, paper mailers; custom sizes; 1- to 3-color printing.
Location	Dhaka
Probable Start Date	January 2026 (pilot in Q4 2025).

Operations will start with one production line capable of 10,000 units/day across a balanced mix: takeaway boxes (40%), cups (30%), and mailers (30%). Product mix can be tuned to customer demand. A second line can be added within 18–24 months to triple capacity.

3. Market Information

Project Capacity: Initial capacity is 10,000 units per day, or 260,000 units per month (26 working days), exceeding break-even volume and supporting stable B2B contracts.

Market Size: The sustainable packaging market in Bangladesh is growing, with the bags and containers segment valued at BDT 9,118.32 million in 2025, driven by regulatory bans on single-use plastics and consumer demand. Globally, the market is projected to grow from BDT 35,593.2 million in 2023 to BDT 51,434.4 million by 2030. In Bangladesh, plastic bans and environmental policies are accelerating adoption of alternatives.

Target Market Size: Green-Pack targets urban Bangladesh, approximately 20-30% of the national market (BDT 1,823.66–2,735.50 million). We aim for a 0.5-1% share initially, equating to BDT 45.59–91.18 million in potential revenue.

Customer Segmentation:

- **Age:** Business owners/managers aged 25-50, digitally engaged and sustainability-aware.
- **Gender:** Neutral, often male in procurement roles.
- **Income:** Mid-to-high income businesses (revenue > BDT 10 million).
- **Education Level:** College-educated, aware of environmental regulations.
- **Other:** Industries include food service (restaurants, cloud kitchens), retail/supermarkets, e-commerce. Buyers prioritize reliability and eco-credentials.
-

Competition Details: Key competitors include:

- **Mans Packaging:** Biodegradable solutions; prices BDT 12-24/unit; focuses on waste reduction.
- **Deshbandhu Packaging Ltd:** Paper-based packaging; BDT 9.6-21.6/unit; emphasizes local sourcing.
- **Mainetti Bangladesh:** Flexible eco-bags; BDT 14.4-30/unit; closed-loop systems.
- **Earth Matters BD/Eco Pack BD:** Compostable products; niche focus. Green-Pack differentiates with customization, local sourcing, and faster lead times.

Competitor	Products	Price Range (BDT/unit)	Key Activities
Mans Packaging	Biodegradable bags/boxes	12-24	Waste reduction
Deshbandhu	Paper-based packaging	9.6-21.6	Local sourcing
Mainetti	Flexible eco-bags	14.4-30	Closed-loop recycling

This analysis highlights a competitive, opportunity-rich market in Bangladesh, driven by policy and consumer trends.

4. Implementation Plan

Work Breakdown Structure (WBS): Phases, timeline, and cost are summarized below.

WBS Level	Task	Description	Duration	Cost
1. Initiation	Business registration	Legal, trade license, VAT	2 weeks	1,000.00
1. Initiation	Site lease & utilities	Lease, utility connections	2 weeks	9,000.00
2. Setup	Civil & electrical works	Flooring, wiring, safety	3 weeks	5,000.00
2. Setup	Machinery procurement	Molding, cutting, printing	6 weeks	38,000.00
2. Setup	Installation & training	Supplier & QA training	2 weeks	3,000.00
3. Operations	SOPs & QA docs	SOPs, QC checklists	2 weeks	1,000.00
3. Operations	Pilot production	Trial runs, test batches	4 weeks	12,000.00
3. Operations	Launch marketing	Samples, collateral	3 weeks	1,500.00
4.0 Ramp	Sales onboarding	Key account outreach	Ongoing	0.00
4.0 Ramp	2nd shift planning	Recruit, train	Months 6-12	0.00

Costs & Operating Plan

Monthly Fixed Costs (BDT):

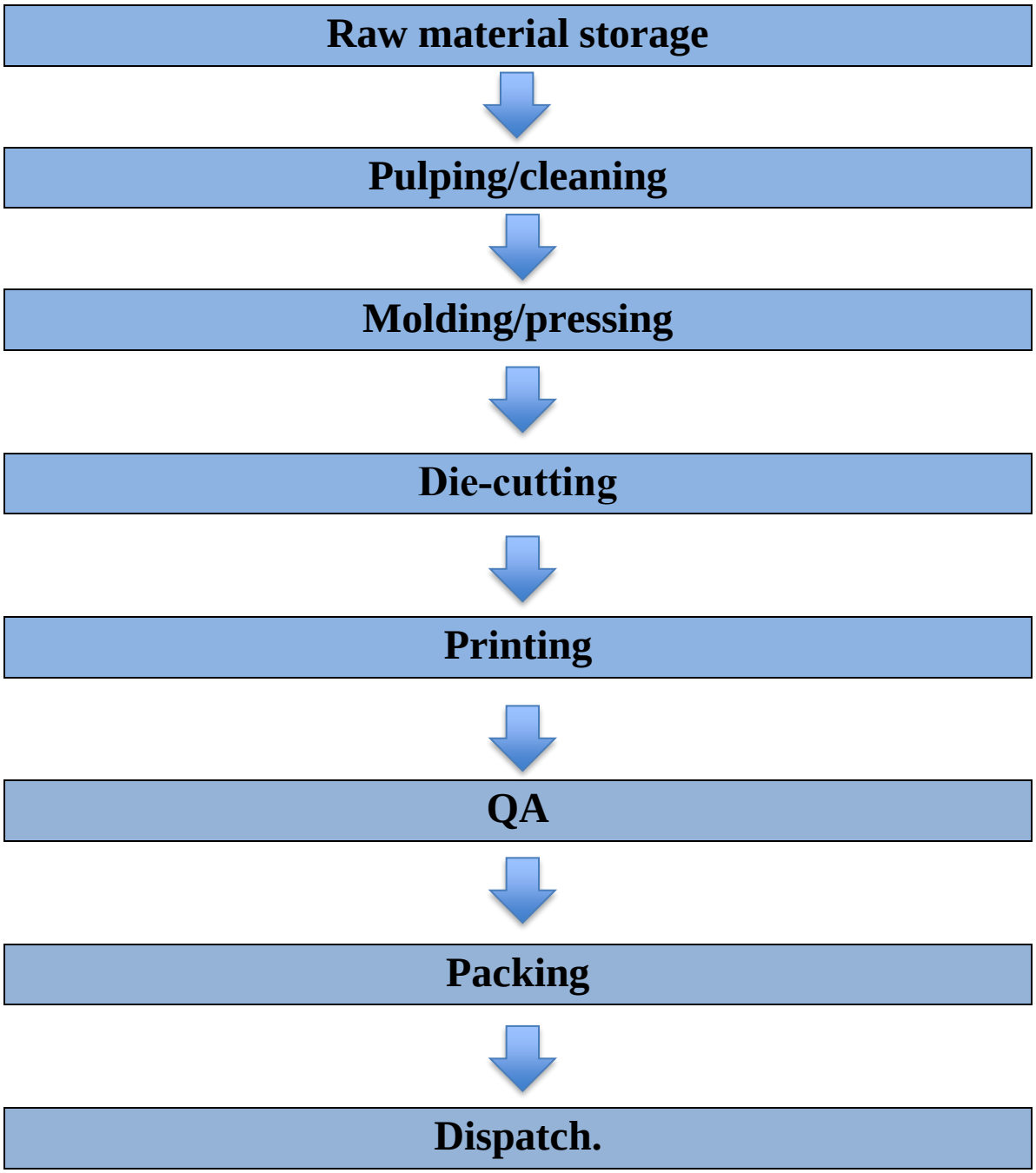
Item	Value
Manpower	6000
Marketing	2000
Overhead & Admin	1500
Utilities & Maintenance	1000

Monthly Operating Snapshot (Month 1):

Metric	Value
Units produced (monthly)	260,000 units
Average price per unit	0.15
Variable cost per unit	0.08
Monthly revenue	39,000.00
Monthly variable cost	20,800.00
Monthly gross margin	18,200.00
Monthly fixed costs	10,500.00
Monthly profit (operating)	7,700.00

5. Technical Approach

Layout: Flowchart



Manufacturing Flow Diagram (textual):

- 1) Receive & store plant-fiber/paper pulp
- 2) Pulp cleaning & preparation
- 3) Molding/pressing to product shapes

- 4) Trimming/cutting (die-cut)
- 5) Surface finishing/printing (as ordered)
- 6) QA sampling & tests (compression, leakage, biodegradability batch checks)
- 7) Packing & labeling
- 8) Finished goods dispatch

Critical Issues & Mitigations:

- Raw material variability → Dual suppliers, incoming QA specs.
- Humidity & drying time → Controlled drying area; dehumidifiers in monsoon.
- Mold/tool wear → Preventive maintenance schedule; spare molds in stock.
- Print quality consistency → Color calibration; sample approvals per batch.

Testing & Inspection:

- AQL-based sampling for dimensions, weight, surface, and print quality.
- Compression strength tests for boxes; leakage tests for cups.
- Biodegradability checks (accelerated conditions) on representative batches.6. Market Penetration Plan

Go-To-Market & Sales:

- Direct B2B: outbound to 200 priority accounts in Dhaka/Chattogram; sampling program.
- Digital: website, WhatsApp ordering, Facebook/LinkedIn outreach with case studies.
- Channel: tie-ups with food packaging distributors; performance-linked incentives.

Supply Chain (end-to-end):

- Procurement: local paper/pulp vendors with SLA on specs and lead time.
- Manufacturing: single-shift to start; scale to two shifts as order book grows.
- Distribution: in-house van for Dhaka; 3PL for out-of-city deliveries.

SWOT Analysis:

Strengths	Weaknesses	Opportunities	Threats
Eco-friendly, customizable, short lead times	New brand; needs awareness & trust building	Policy pressure for plastic alternatives; fast-growing segment	Price competition; raw material volatility

7. Financial Analysis

7.1 Project Budget & Initial Investment

Initial Investment Breakdown:

Item	Cost (BDT)
Site lease deposit (3 months)	6,000.00
Renovation & utilities setup	5,000.00
Machinery: molding/cutting/printing + molds	38,000.00
Installation & training	3,000.00
Power backup (generator/UPS)	3,000.00
IT (PCs, printer, software)	2,000.00
Delivery van (used)	10,000.00
Licenses & professional fees	2,000.00
Pre-launch marketing & samples	1,500.00
Initial raw materials (2 months)	20,000.00
Cash buffer	9,500.00

Total Initial Investment: 100,000.00 (Equity 60,000.00 + Bank Loan 40,000.00)

7.2 Calculations

Monthly Revenue (R):

$$R = Q \times P$$

Where: Q = monthly units produced = 10000 × 26 = 260,000 units

P = average selling price per unit = 0.15

Calculation: R = 260,000 × 0.15 = 39,000.00

Monthly Variable Cost (TVC):

$$TVC = Q \times v$$

Where: v = variable cost per unit = 0.08

Calculation: TVC = 260,000 × 0.08 = 20,800.00

Monthly Gross Margin (GM):

$$GM = R - TVC$$

Calculation: GM = 39,000.00 − 20,800.00 = 18,200.00

Monthly Fixed Costs (FC):

$$FC = \Sigma\,(fixed\ cost\ components)$$

Components: manpower + marketing + overhead/admin + utilities/maintenance

FC = 6,000.00 + 2,000.00 + 1,500.00 + 1,000.00 = 10,500.00

Monthly Operating Profit (π_m):

$$\pi_m = GM - FC$$

$\pi\_m = 18,200.00 - 10,500.00 = 7,700.00$

Break-Even Volume (units per month):

$$Q_{be} = \frac{FC}{P-v}$$

Where: P − v = contribution margin per unit = 0.15 − 0.08 = 0.07

Q_{be} = 10,500.00 ÷ 0.07 = 150,000 units/month

Margin of Safety (%): (1 − Q_be / Q) × 100 = (1 − 150,000 / 260,000) × 100 = 42.31%

Bank Loan EMI (monthly):

$$EMI = \frac{P \times r \times (1+r)^n}{(1+r)^n - 1}$$

Where: P=40,000.00, annual rate=10% ⇒ monthly r = 0.10/12 = 0.008333, n = 36 months

EMI = 40,000.00 × 0.008333 × (1+0.008333)^36 ÷ ((1+0.008333)^36 − 1) = 1,290.69 per month

Annual debt service (first 3 years): 15,488.25

5-Year Profit Projections (Nominal, 7% inflation):

$$\text{Profit}_t = \text{Profit}_1 \times (1+g)^{t-1}$$

Year-1 Operating Profit (annualized): 92,400.00

Year-2: 98,868.00 | Year-3: 105,788.76 | Year-4: 113,193.97 | Year-5: 121,117.55

Profits (Operating vs After Debt Service):

Year	Operating Profit (BDT)	After Debt Service (BDT)
1	92,400.00	76,911.75
2	98,868.00	83,379.75
3	105,788.76	90,300.51
4	113,193.97	113,193.97
5	121,117.55	121,117.55

Payback Period (months):

Method: accumulate monthly operating profit (with inflation) until it equals initial investment.

Initial investment: 100,000.00

First-month profit: 7,700.00; monthly inflation factor: 1.00565

Computed payback: 13 months (≈ 1.08 years)

Net Present Value (NPV) over 5 years (nominal):

$$NPV = -I_0 + \sum_{t=1}^{5} \frac{CF_t}{(1+r)^t}$$

Assumptions: discount rate r = 12%,

cash flows CF_t = annual profit (nominal).

Operating NPV: 277,277.48

NPV after debt service: 240,077.32

Conclusion

Green-Pack – Eco Friendly Packaging Solutions represents a timely and impactful response to the growing demand for sustainable alternatives in Bangladesh's packaging industry. By leveraging locally sourced raw materials, efficient manufacturing processes, and a clear market penetration strategy, the project not only ensures profitability but also contributes significantly to environmental preservation. The financial analysis confirms the venture's viability with a short payback period, strong margins, and positive long-term returns. Beyond numbers, Green-Pack aligns with global sustainability goals and national regulations, making it well-positioned to build trust among consumers and businesses alike. In essence, Green-Pack is more than a business venture—it is a step towards a cleaner, greener, and more responsible future for the packaging sector.

Appendix A: Detailed Assumptions

All key assumptions driving the model are listed below. Adjust as needed for your specific context.

Operational Assumptions

Item	Value
Units/day	10,000
Working days/month	26
Average price/unit	0.15
Variable cost/unit	0.08
Monthly fixed costs	10,500.00
Initial capacity (monthly units)	260,000

Financial Assumptions

Item	Value
Inflation (annual)	7.0%
Discount rate (annual)	12.0%
Initial investment	100,000.00
Equity	60,000.00
Bank loan	40,000.00
Loan interest (annual)	10.0%
Loan term	36 months

Appendix B: Bill of Materials & Equipment (Indicative)

BOM & Equipment

Item	Type	Notes	Cost (BDT)
Plant fiber/paper pulp	Raw material	2 months initial stock	20,000.00
Molding press	Equipment	Primary forming	20,000.00
Die-cut machine	Equipment	Trimming	5,000.00
Printing unit (2-color)	Equipment	Branding/labels	8,000.00
Air compressor & molds	Equipment	Utilities & tooling	5,000.00
Dehumidifier/dryer racks	Equipment	Drying support	3,000.00
QA tools (calipers, scales)	Equipment	Inspection	1,000.00

References:

[1] M. Marsh and B. Bugusu, “Food packaging—Roles, materials, and environmental issues,” *Journal of Food Science*, vol. 72, no. 3, pp. R39–R55, 2007.

[2] S. Magnier and A. Crié, “Communicating packaging eco-friendliness: An exploration of consumers’ perceptions of eco-designed packaging,” *International Journal of Retail & Distribution Management*, vol. 43, no. 4/5, pp. 350–366, 2015.

[3] M. S. Islam and N. Huda, “Packaging waste management in developing countries: A Bangladesh perspective,” *Waste Management & Research*, vol. 38, no. 10, pp. 1129–1141, 2020.

[4] International Finance Corporation (IFC), *Tackling Plastic Waste in Bangladesh: Market Assessment and Solutions*, Dhaka: IFC, 2022.