
40
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IMMUNOLOGICALS
LIMITED
Years
of Saving Lives

CII National Award for Environmental best practices 2026

INDIAN IMMUNOLOGICALS LIMITED



Sustainable Packaging Solution-
Plastic to Paper Trays



INDIAN IMMUNOLOGICALS LTD

राष्ट्रीय डेरी विकास बोर्ड
NATIONAL DAIRY DEVELOPMENT BOARD

40 Years of Saving Lives

IIL Exports

Animal and Human vaccines to more than 50 countries

Several billion doses	**150+**
of vaccines sold	Registered Products



Indian Immunologicals Limited was set up by National Dairy Development Board (NDDB) in 1982 with the objective of making vaccines available to farmers at an affordable price.

Indian Immunologicals Ltd (IIL) is the market leader in veterinary and human biologicals in India. It manufactures over 150+ products.

IIL operates one of the largest plants in the world for veterinary vaccines. IIL has adequate infrastructure and cold chain distribution capability to reach out to various parts of India and world market..

IIL is a major player in the human vaccine market in India, focusing on the pediatric and rabies vaccine segments. IIL is also a major supplier of pediatric vaccines to India's large Universal Immunization Program

Indian Immunologicals Ltd (IIL) has emerged as the India's largest manufacturer of Foot and Mouth Disease (FMD) vaccine & World's Largest producer and supplier of the human Rabies vaccine.

Project Trigger & Solution

TRIGGER

Sustainable material for improving environmental efficiency

- Need to reduce plastic consumption at source
- Higher tray material intensity
- Higher storage space
- Opportunity to improve packaging productivity
- Opportunity to reduce GHG emissions

SOLUTION

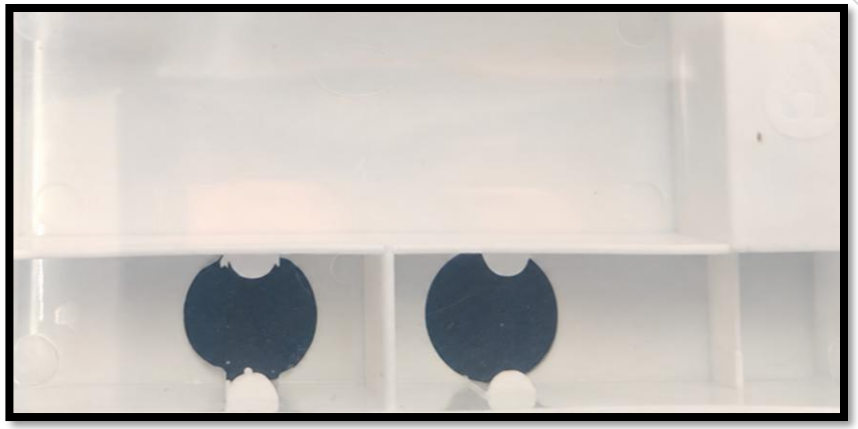
Paper tray in place of Plastic tray

- Plastic eliminated from packaging application
- Tray weight reduced
- Reduced storage space
- Automated vial / ampoule packing
- Productivity with material conservation
- Reduced GHG emissions

Material conservation, carbon reduction and productivity through sustainable packaging



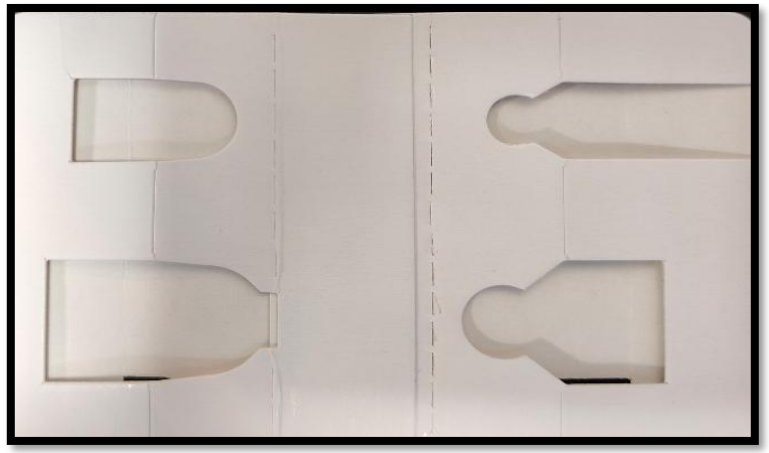
Before vs After – The Packaging Transformation



BEFORE – PP TRAY

15 g approx.

- Manual packing process
- Plastic consumption at source
- Limited compatibility with automated packing



AFTER – PAPER TRAY

7 g approx.

- Compatible with High-Speed Packing Machine (HSPM)
- Plastic eliminated from tray application
- ≈40–50% lower storage space requirement

8 g
less material / tray



53.3 %
weight reduction

Paper-Tray Integration with High-Speed Packing Machine

Paper-tray adoption enabled the packing operation to use the High-Speed Packing Machine (HSPM)

1. **Paper tray feed**
   Tray introduced to robot cell
2. **Robot 1**
   Picks tray and places it in bucket
3. **Robots 2 & 3**
   Load vials / ampoules into tray
4. **Translator + Cartonator**
   Transfer, inspect & insert tray into carton
5. **Bundler**
   Groups & wraps cartons

Operational benefits

- Manual Plastic-tray packing → automated paper-tray packing
- Cycle time of ~3.5 days/batch of manual packing reduced to automated packing of ~1 day/batch
- Improvised productivity
- Reduced process variations and eliminating handling errors

HSPM qualification included paper-tray trials, custom-designed for vial, ampoule and carton dimensions.



Paper-Tray Integration with High-Speed Packing Machine





Challenges & Engineering Response – Trial to Standardization

≈6 months of development, repeated vendor trials and machine qualification converted a paper concept into a production-ready tray.

CHALLENGE	ENGINEERING RESPONSE	RESULT / LEARNING
Paperboard stiffness & thickness	Optimized paper grade, thickness and hardness through supplier trials.	**Machine-compatible tray behavior**
Tray folding / cut geometry	Modified folds and cut dimensions to suit vial, ampoule and carton interfaces.	**Improvised tray formation & fitment**
Gumming / adhesive control	Tuned gumming quantity and location through repeated vendor iterations.	**Better dimensional stability**
Carton opening, transfer & insertion	Validated dimensions and interfaces during HSPM qualification and line trials.	**Reliable transfer through packing route**
Consistency at production scale	Finalized specification after iterative trials and engineering batches..	**Process consistency**



Uniqueness – Environmental Design + Automation

The intervention changed the material, the environmental footprint and the packing route together — not merely the tray material.

1 PREVENTION AT SOURCE

Virgin PP is eliminated from the tray application before it becomes packaging waste.

2 LIGHTWEIGHTING BY DESIGN

Tray mass reduced from 15 g to 7 g — 53.3% less material per packed unit.

3 AUTOMATION-COMPATIBLE SUSTAINABILITY

The redesigned paperboard tray runs through HSPM, linking material conservation with packing productivity.

4 FUNCTIONAL PERFORMANCE RETAINED

Material was changed and lightweighted without compromising tray fit, vial / ampoule holding, carton compatibility or automated handling.

UNIQUE VALUE **Source reduction + lower material intensity + lower GHG footprint + automated packing**



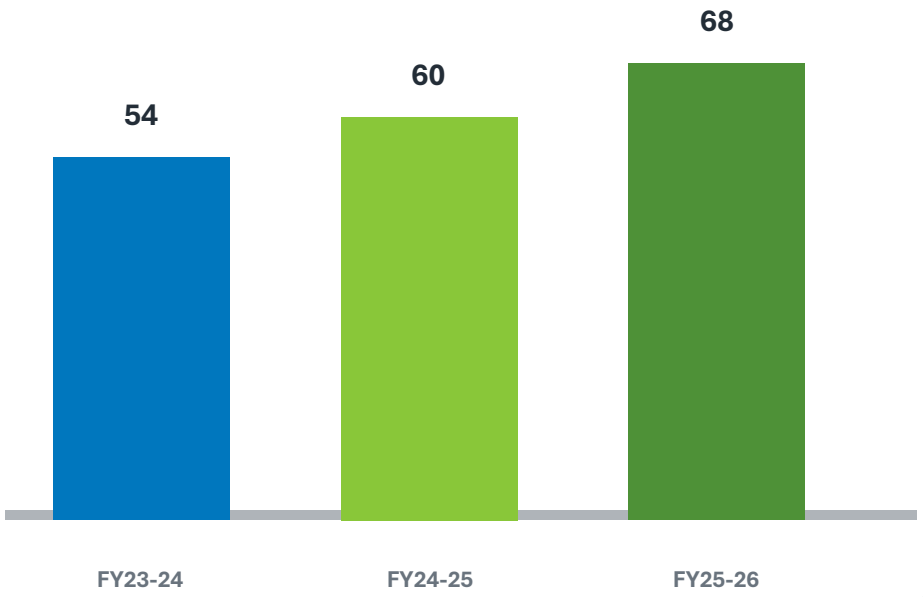
Tangible Benefits – Material, Carbon & Productivity

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Paper-tray batches processed through HSPM

54 → 68 batches/year

26% increase in annual batches



Project period: FY23-24 to FY25-26

PROJECT SCALE

FY23–24 to FY 25-26

15.20 M
trays processed

182
batches processed

MATERIAL IMPACT

228.0 t
Virgin PP avoided

106.4 t
Virgin paperboard used

121.6 t
net material reduction

53.3% lower weight

CARBON IMPACT

459.6 tCO_2e
GHG emissions avoided

~153.2 tCO_2e/year average

78.3% reduction | 3-year period

PRODUCTIVITY IMPACT

~3.5 → ~1 day
packing cycle / batch

~71% cycle-time reduction

Material & GHG values based on FY23-24 to FY25-26 project-period data.

Basis: 182 batches; ~83,500 trays/batch; 15 g virgin PP vs 7 g virgin paperboard; UK Govt. 2026 factors.



Intangible Benefits – Environmental Capability, Mindset & Ownership

Beyond quantified savings, the project-built capability to integrate sustainability into packaging and engineering decisions.

1 ENVIRONMENTAL MINDSET

Source reduction, lightweighting and lifecycle thinking.

2 SKILL UPGRADATION

Skills in tray design, machine trials, qualification and impact quantification.

3 STAKEHOLDER MANAGEMENT

Marketing, Manufacturing, Engineering, QA and Sustainability worked together to develop, validate and scale the intervention.

4 COLLABORATIVE PROBLEM SOLVING

Joint problem-solving and knowledge sharing across functions and suppliers. Supplier capability was strengthened through repeated trials and technical feedback.

5 REPLICATION CAPABILITY

Repeatable pathway: identify → redesign → trial → validate → quantify → scale.

ORGANISATIONAL LEARNING Experience gained in supplier development, paperboard optimization and machine-compatible sustainable packaging.

Sustainability moved from a parallel initiative to an integral part of packaging design and operational improvement.



Replication Potential – A Practical Model to Scale

The project creates a repeatable development pathway that can be applied to other eligible packaging formats.

1 IDENTIFY
Plastic / high-material component

→

2 REDESIGN
Lower-impact alternative

→

3 TRIAL
Supplier + machine trials

→

4 VALIDATE
Quality + functional fit

→

5 SCALE
Standardize & deploy

WITHIN IIL

- Screen eligible packaging components
- Prioritize virgin-plastic secondary packs
- Add material screening to packaging / supplier reviews

ACROSS PHARMA / VACCINE SECTOR

- Applicable to tray-based vial / ampoule packs
- Requires trials + quality approval
- Strong fit where automation compatibility can be validated

KNOWLEDGE-SHARING ROUTE Internal packaging / engineering reviews • Supplier development • Case-study sharing through CII / industry forums

Replication principle: preserve pack function first — then optimize process, material and carbon performance.



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Environmental Alignment & Way Forward

ENVIRONMENTAL / STANDARDS ALIGNMENT

PLASTIC WASTE MANAGEMENT RULES, 2016

Supports source reduction and reduced virgin-plastic consumption.

MISSION LiFE

Supports waste reduction and movement towards lower-plastic alternatives.

ISO 18602:2013 – PACKAGING OPTIMISATION

Aligns with reducing packaging material weight while retaining required function.

WAY FORWARD

FINANCIAL BENEFIT VALIDATION

Finalize cost-benefit assessment and maintain calculation backup.

NEXT APPLICATION SCREENING

Screen other packaging components for similar material-reduction opportunities.

SUSTAINABLE PACKAGING CRITERIA

Include material efficiency, functional performance and environmental impact in future packaging / supplier reviews.

Approach going forward: reduce material → validate function → quantify benefit → replicate



Key Learnings & 10 Practices for Sustainable Packaging

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Three principles from the project

REDUCE AT SOURCE
Eliminate avoidable material before managing the resulting waste.

DESIGN FOR OPERATIONS
A sustainable alternative succeeds only when it works with the process and equipment.

VALIDATE, QUANTIFY & SCALE
Trial rigorously, prove function, calculate impact and then standardize.

10 PRACTICES TO REPLICATE

1. Measure the baseline
2. Target source reduction
3. Lightweight first
4. Select lower-impact material
5. Design for equipment
6. Co-develop with suppliers
7. Trial iteratively
8. Validate quality & function
9. Quantify material + GHG
10. Standardize & replicate

15.20 M trays | **121.6 t less material** | **459.6 tCO_2e avoided** | **~71% cycle-time reduction**



Small component. Industrial-scale impact.



Thank You

