

India Palm Leaf Tableware Industry 2025–26

*Cultivation. Manufacturing. Trade flows. Destination geography.
Logistics. Regulatory pull. A four-year forecast for the world's only export-
grade palm leaf plate industry.*

PERIOD

**FY 2017–18 →
FY 2028–29**

SCOPE

**Palm Leaf Plates
& Bowls**

HS 46021919 + 46021990

COVERAGE

**India · 95 export
destinations**

EDITION

First Edition

JUNE 2026 REFRESH

Contents

OVERVIEW

—	Executive Summary	Five findings. One reweighted map.	03
---	--------------------------	------------------------------------	-----------

THE EIGHT CHAPTERS

00	Setting the Frame	Global industry triangulation · the 62/98 asymmetry	04
01	The Palm and the Cluster	Raw material, supply base, Karnataka concentration	09
02	Process, Tiers, Shocks	Manufacturing, capacity, the five-tier hierarchy	14
03	The Nine-Year Trajectory	Exports, trade flows, the FY 25-26 contraction	19
04	Destination Markets	Geography of demand, US shock, German anchor	24
05	Containers, Ports, Discipline	Logistics, freight, the 10-day discipline	29
06	The Pull and the Stack	Regulatory architecture, certification stack	34
07	FY 2026-29 Outlook	Three-scenario forecast, structural conclusions	39

REFERENCE

A	Methodology & Sources	Trade-data authority, conversion basis, source catalogue	44
----------	----------------------------------	--	-----------

Five findings. One reweighted map.

Eight chapters. One conclusion. The destination map of the world's only export-grade palm leaf plate industry was permanently re-weighted by FY 2025-26 — and the structural recovery favours the Tier 1 manufacturers that already hold the European certified channel.

01

FINDING 01

The industry contracted 25% in FY 2025-26 — but the cause is single-jurisdiction, not structural.

Industry value fell from US\$ 26.73M in FY 2024-25 to US\$ 20.12M (provisional) in FY 2025-26. The United States accounted for 72% of that contraction (US\$ -4.75M, -43% bilateral). The cause was two near-simultaneous US policy actions: the IEEPA tariff regime ($\approx$ 50% effective rate Aug 2025–Feb 2026, reduced to 18% thereafter) and the FDA classification action. Both apply only to US imports.

02

FINDING 02

Germany grew through the contraction. Western Europe overtook the US as the largest regional destination.

Germany posted +9% (US\$ 3.23M $\rightarrow$ 3.51M) — the only major destination to grow. Belgium +15%, Sweden +27%, France growing; UK and Netherlands modest negatives. Western European regional share rose from 41% to 48%; the US fell from 41% to 31%. The reweighting holds across all three forecast scenarios through FY 2028-29.

03

FINDING 03

India's 62% cultivation share and 98% export share — the structural moat — held under peak tariff pressure.

Where US buyers continued sourcing through the tariff window, the substitution pattern was India 48%, Sri Lanka 34%, China 7%, others 11%. No alternative origin can replicate India's combined cultivation (1.10M ha of $\approx$ 1.76M world total) and processing capacity (80–120M plates/month) within the multi-year horizon required by Tier 1 European procurement.

04

FINDING 04

The 7-to-12 certification stack and the 10-day loading discipline favour Tier 1 — across all scenarios.

Tier 1 holds the full certification stack (ISO 9001/14001, LFGB, EU 1935/2004, FDA GRAS, BSCI, EN 13432, USDA BioPreferred), the multi-year European importer relationships, and the standing-inventory infrastructure behind the 10-day loading guarantee. The Tier 1 share of output is projected to rise from $\approx$ 40% (FY 24-25) to 50–55% by FY 28-29 in all three scenarios.

05

FINDING 05

The central case: US\$ 26.5M by FY 2028-29 — recovery to the FY 2024-25 level, with a permanently different composition.

Three scenarios. Best US\$ 29.0M (full US tariff rollback + accelerated EU EPR + 2–3 new top-20 destinations). Central US\$ 26.5M (18% tariff moderating to 10–12% by CY 2027; EU stable; Canada and Australia growth). Bear US\$ 21.5M (tariff persistence; EU plateau; competitive pressure). The headline number depends on US policy. The structural reweighting — Western Europe permanently dominant, Tier 1 share rising, cultivation moat intact — holds in all three.

00

CHAPTER ZERO · GLOBAL INDUSTRY TRIANGULATION

Setting the Frame

Before the destination map can be read, the industry must be sized. India holds 62.4% of world areca cultivation and 98% of world palm leaf plate exports — a 36-percentage-point asymmetry that no alternative origin can replicate within a multi-year horizon.

“HS 4602 covers basketwork, matting, and a long list of plaiting articles. Only two sub-codes carry palm leaf plates — HS 46021919 and HS 46021990. Read either alone and the industry is undercounted by half; read the heading and it is overstated by a factor of three.”

ECODYNE RESEARCH · INDUSTRY TRIANGULATION NOTE

JUNE 2026

IN THIS CHAPTER

00.01	The HS-code framework: getting the denominator right	p. 05
00.02	Cultivation vs export — India's 36-point asymmetry	p. 06
00.03	The broader vs the specific: HS 4602 dissected	p. 07
00.04	Market sizing, substitute landscape, and the moat	p. 08

This chapter draws on FAOSTAT cultivation data, UN Comtrade HS 4602 mirror series, Volza shipment records, and the trade-data triangulation note prepared for this report.

One country grows the palm. One country ships the plate.

India accounts for 62.4% of world areca cultivation and 98% of world palm leaf plate exports. The cultivation-to-export asymmetry — 36 points wider on the export side — is the structural fact that defines every downstream decision in the industry.

WORLD CULTIVATION SHARE

62%

Hectares under areca · FAOSTAT 2024. India 1.10M ha of ≈ 1.76M ha global.

WORLD PLATE EXPORT SHARE

98%

Combined HS 46021919 + 46021990. Sri Lanka, China, Indonesia, Vietnam together ≈ 2%.

CULTIVATION → EXPORT GAP

+36

Points: export share minus cultivation share. India over-converts; others under-convert.

REPLICATION HORIZON

5-8 yr

Minimum to reach Tier 1 capacity. Tree maturity 7 yr + capacity build 2 yr.

WHAT THIS MEANS

The industry is structurally a single-origin export industry. Tariff actions or origin-substitution attempts do not eliminate the moat — they confirm it. For any commercial planning horizon under a decade, the world's palm leaf plate trade is an India-versus-itself competition.

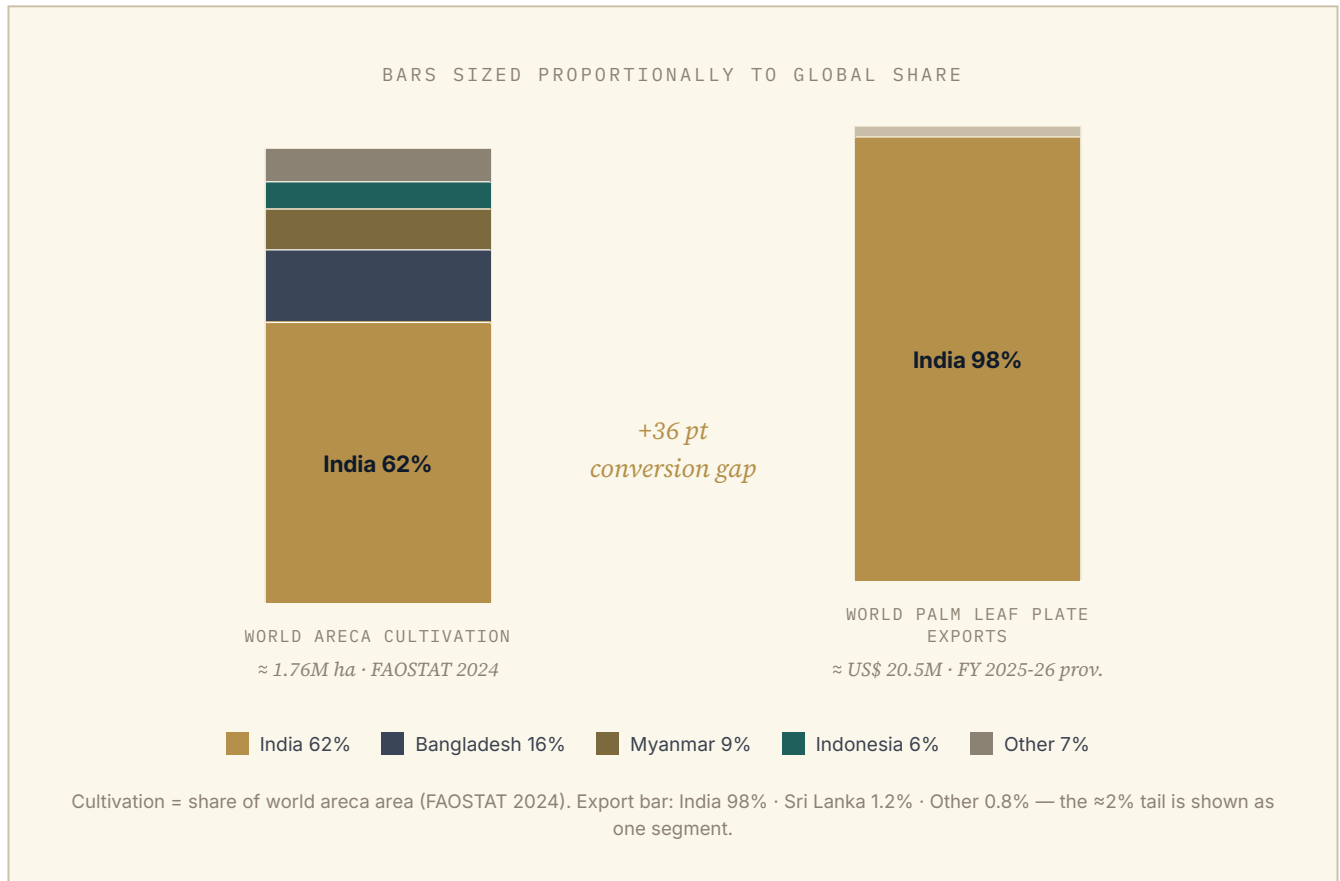
Per FAOSTAT, world areca catechu cultivation in 2024 covered approximately 1.76 million hectares, of which India held 1.10 million hectares and the next-largest producers — Bangladesh, Myanmar, Indonesia, Sri Lanka — collectively held under 600,000 hectares. India's share has held above 60% for every reporting year of the past decade. On the export side, combined customs data for HS 46021919 plus HS 46021990 places India's share of

world palm leaf plate exports at 98% across the FY 2024-25 reporting window. The remaining 2% is fragmented across Sri Lanka, China, Indonesia, Vietnam, and a handful of small entrants. No alternative origin holds either the cultivation footprint or the processing capacity to displace this position within the FY 2026-29 forecast horizon.

FIG. 0.1 · CULTIVATION VS EXPORT ASYMMETRY FAOSTAT 2024 · TradeStat + UN Comtrade FY 2025-26 prov.

India holds 62% of the world's areca palms — and ships 98% of the world's plates.

The 36-point gap between cultivation share and export share is the conversion gap: India turns leaf into plate at a rate no other origin matches.



01

The moat is geographic, not technological.

Karnataka's ≈549,000 ha of areca cultivation — about half the national footprint, concentrated in seven districts — is the supply base. No other geography of comparable density exists outside India.

02

The moat is also conversion-rate.

Indian Tier 1 plants convert leaf to plate at industrial scale (3–6M plates/month per site). Bangladesh, Myanmar, and Indonesia hold the leaf but lack Tier 1 manufacturing capacity.

03

Tariff shocks cannot dislodge it.

Even at peak US tariff pressure in FY 2025-26, India retained 48% of remaining US substitute volume — the highest share of any origin.

The 4-digit heading is a basketwork market. The plate industry is two 8-digit sub-codes.

PLATES

HS 46021919 + 46021990

THE ONLY TWO PLATE CODES • INDIA-SPECIFIC 8-DIGIT

US\$ 20.12M

- **HS 46021919** covers palm leaf items other than baskets — the principal palm-leaf-plate sub-heading. US\$ 9.03M in FY 2025-26.
- **HS 46021990** is the residual sub-heading carrying the remaining palm-leaf-plate shipments. US\$ 11.09M in FY 2025-26.
- **India is the only country** with palm-leaf-specific 8-digit HSN codes — itself a structural indicator of industry concentration.
- **Combined US\$ 20.12M** is the only complete measurement. Reading either code alone undercounts by roughly half.

INDIA PALM-LEAF-PLATE EXPORTS BY SUB-CODE (US\$ M, FY 25-26)



HEADING-LEVEL

HS 4602 (4-digit)

BASKETWORK • WICKERWORK • MATS • SCREENS

≈ US\$ 1.3B

- **HS 4602 globally** is a basketwork market: China US\$ 970.5M, Vietnam US\$ 213.6M, Indonesia US\$ 79.5M in 2019. None of this is palm-leaf-plates.
- **India's plate trade is structurally separate** — different raw material (palm sheath vs willow/rattan), different process (heat-press vs hand-weave), different buyer channel (foodservice vs décor).
- **Sri Lanka** has total HS 4602 exports of US\$ 846K across all categories in 2024 — the entire heading-level trade of one other origin country is under US\$ 1M.
- **Reading HS 4602 as one industry** conflates two categories; heading-level analyses overstate India's 'palm-leaf industry' by mixing in the global wickerwork trade.

GLOBAL HS 460210 — TOP EXPORTERS 2019 (US\$ M)



Two industries, one HS heading.

Structural separation of palm-leaf-plates from HS 4602

PALM-LEAF-PLATES • INDIA • HS 46021919 + 46021990 • WICKERWORK / BASKETWORK / MATS • GLOBAL • HS 4602 FAMILY • US\$ 1.3B+ (2019)

Strip widths illustrative — the two industries share HS 4602 only at the 4-digit level.

The world picture: cultivation, exporters, substitutes, market size.

WORLD ARECA AREA · FAOSTAT 2024

62% ≈1.76M ha

India 1.10M ha (62%); Bangladesh 0.28M (16%); Myanmar 0.16M (9%); Indonesia 0.11M (6%); tail. India's share has not dropped below 60% in a decade.

SUBSTITUTE LANDSCAPE

5 substrates

Palm leaf competes against bagasse, PLA bioplastic, moulded paper, and wooden cutlery. Substrate choice is driven by destination regulation (EU EN 13432, US FDA) and price point.

INDIA SHARE OF WORLD PLATE EXPORTS

98% 1 of ≈6

India holds 98% of combined HS 46021919 + 46021990 export value. Sri Lanka ≈ 1.2%; balance from China, Indonesia, Vietnam, Bangladesh. No other country > 1.5%.

WORLD MARKET SIZE · FORECAST

+9.8% \$26.5→38M+

Central-case forecast (Ch 7). Structurally small in dollar terms but strategically significant as the only fully-compostable, no-input, no-irrigation food-contact substrate.

IMPLICATIONS FOR THE FORECAST

The frame this report uses.

Throughout the eight chapters that follow, palm leaf plate trade is measured at sub-heading granularity (HS 46021919 + HS 46021990, combined), India is treated as the structural near-monopoly origin, and the 62% cultivation / 98% export asymmetry is referenced as the moat that no commercial planning horizon can credibly close.

CHAPTER SOURCES

FAOSTAT — areca catechu cultivation area by country, 2024 · UN Comtrade — HS 4602 sub-heading mirror-trade triangulation FY 2024-25 / FY 2025-26 provisional · TradeStat / DGCI&S — Indian export records HS 46021919 + HS 46021990 combined · Volza Grow — shipment-level export verification.

01

CHAPTER ONE · RAW MATERIAL & SUPPLY

The Palm and the Cluster

India's areca palm covers approximately 1.10 million hectares across six producing states, shedding on the order of eleven billion leaf sheaths a year as a by-product of nut cultivation. Within that footprint, Karnataka holds about half the area and effectively all of the plate-grade processing density. The supply base is not constrained; the cluster discipline is.

“Manufacturers in Tamil Nadu depend on raw-material aggregators who truck leaf 20 to 36 hours from Karnataka. By the time the leaves arrive, the journey itself has often initiated fungal contamination — rendering the leaf unsuitable for export-grade output.”

VINAY MANJESHWAR · FOUNDER, ECODYNE TABLEWARE

15+ YEARS IN PALM LEAF EXPORT

IN THIS CHAPTER

01.01	India — the 1.10-million-hectare footprint	p. 10
01.02	Karnataka — where the plate industry sits	p. 11
01.03	Karnataka vs Tamil Nadu — the cluster differential	p. 11
01.04	Lifecycle, CAMPCO, CPCRI, the farmer base	p. 12

This chapter draws on Government of India Horticultural Statistics 2022-23, FAOSTAT cultivation data, CPCRI agronomic research, and CAMPCO aggregation records.

An eleven-billion-sheath supply base. The constraint is not leaf.

India's 1.10 million hectares of areca cultivation shed on the order of eleven billion leaf sheaths a year as a naturally-shed by-product of nut cultivation — every sheath falls to the ground; none is harvested. Total industry plate output consumes only a low-single-digit share of the plate-grade supply.

NATIONAL CULTIVATION AREA

1.10M

Hectares · 6 states. Karnataka ≈549K (≈50%); Kerala, Assam, Meghalaya and tail make up the rest.

ANNUAL SHEATH PRODUCTION

≈11B

Naturally shed, not harvested. Areca palm sheds 7–8 sheaths per tree per year across a 40-year life; plate-grade ≈ 8.9B.

LEAF-BASE UTILISATION

≈5–6%

Plate output as a share of plate-grade sheath supply. Materially under-utilised on every plausible domestic assumption.

KARNATAKA CULTIVATION GROWTH

+97%

2017 → 2023, hectares. State expansion 279K → 549K ha, driven by ₹50K+/quintal nut prices.

WHAT THIS MEANS

Supply is not the constraint. The binding constraint on industry growth is downstream — processing capacity, certification stack, and channel access. Even on liberal domestic-consumption assumptions, the leaf base is materially under-utilised.

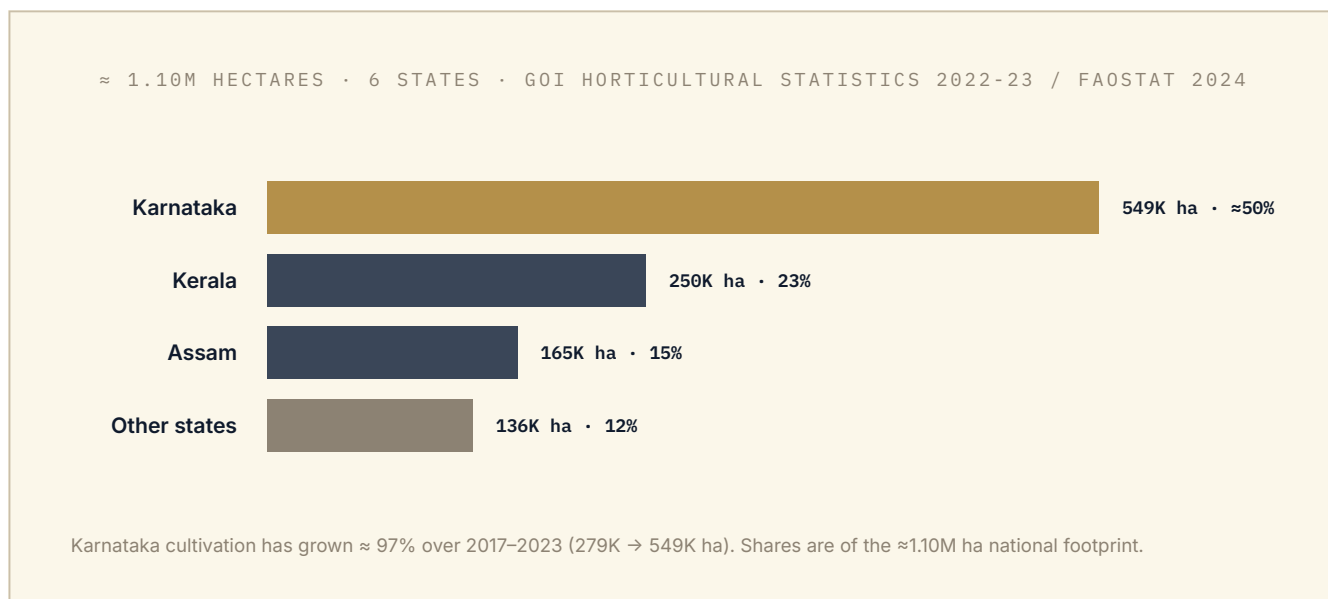
The areca palm (*Areca catechu*) has a 40-year productive life. Its primary commercial output is the areca nut. Its leaf sheath — the fibrous outer covering that wraps the palm trunk — is shed naturally seven to eight times a year and falls to the ground; it is not harvested. The sheath was traditionally collected for domestic use or treated as a low-value by-product. The plate industry's

emergence in the 2010s converted this discarded output into an export commodity. The structural significance is that plate manufacturing adds zero demand on the palm itself — no irrigation, no fertilisation, no harvest-cycle modification. The industry sits entirely within the by-product economy of an existing crop, which is the basis of its compostability and sustainability proposition.

FIG. 1.1 · INDIA ARECA CULTIVATION — STATE ≈ 1.10M hectares · 6 states · GoI Horticultural Statistics 2022-23
BREAKDOWN

India: ≈1.10 million hectares across six producing states. Karnataka holds about half.

The all-India footprint is the starting point. Within it, Karnataka's ≈549,000 hectares form the cluster that concentrates virtually all plate-grade processing capacity.



01

India is the structural base.

≈1.10 million hectares concentrated in six states — a supply ceiling more than fifteen-fold above current plate consumption.

02

Karnataka is the cluster.

Of the ≈1.10M ha total, ≈549,000 ha (≈50%) sit in Karnataka — and seven Karnataka districts produce ≈ 80% of the state's plate output. Cluster density, not just acreage, is the moat.

03

Institutional anchorage exists only in Karnataka.

CAMPCO aggregation (since 1973, 100,000+ farmers) and CPCRI agronomic research (Vittal) sit in coastal Karnataka. No other origin geography has equivalent anchorage.

The cluster differential: why Karnataka is a structural cost leader.

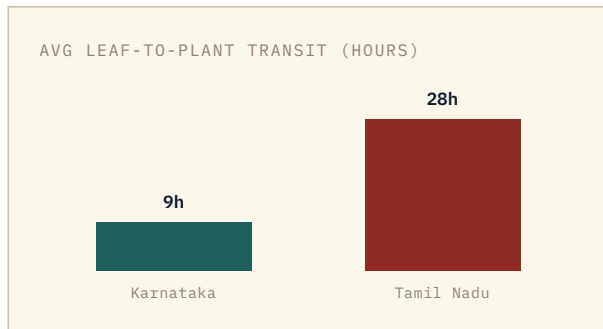
THE CLUSTER

Karnataka

≈549,000 HA • 7 DISTRICTS • INSTITUTIONAL ANCHORAGE

30–50 km

- **Short collection radii.** Plants source within 30–50 km. Leaf reaches the plant within 6–12 hours of shedding — well before fungal contamination risk.
- **CAMPCO aggregation.** 100,000+ areca farmers institutionally aggregated since 1973: stable price, dependable volume, established traceability.
- **CPCRI research base.** Agronomic research at Vittal provides extension support no other origin geography has.
- **Mangalore port proximity.** ≈ 55% of industry container volume routes through NMPT — the shortest inland haul in the industry.



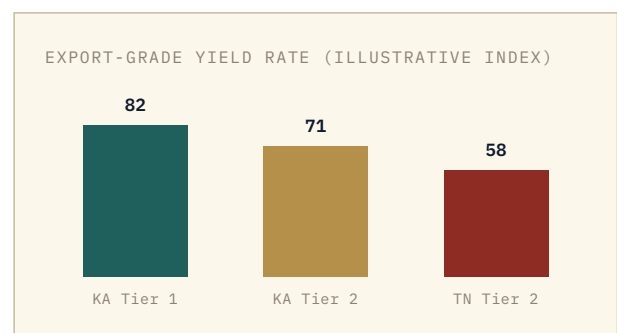
THE AGGREGATOR DEPENDENCY

Tamil Nadu

TRUCKED-IN LEAF • CONTAMINATION RISK • COST PENALTY

20–36 hr

- **Aggregator dependency.** Plants depend on raw-material touts who truck leaf 20–36 hours from Karnataka. Aggregator margins compress plant economics.
- **Fungal contamination.** Long-haul transit initiates fungal degradation; by arrival, secondary cleaning is required and a portion is unsuitable for export-grade.
- **Quality yield penalty.** Tier 1 export-grade yield in Tamil Nadu plants runs structurally 15–25% below comparable Karnataka plants on identical leaf grades.
- **No CAMPCO equivalent.** Tamil Nadu lacks an institutional farmer-aggregation cooperative; procurement is fragmented across hundreds of intermediaries.



Karnataka vs Tamil Nadu.

Leaf freshness, institutional anchorage, and inland haul

KARNATAKA • SHORT RADIUS • CAMPCO • CPCRI • EX-MANGALORE

TAMIL NADU • TRUCKED-IN LEAF • YIELD PENALTY

The Karnataka cluster's structural cost and quality advantage is why the Tamil Nadu base has not displaced it.

The supply system: lifecycle, aggregation, research, partnerships.

ARECA LIFECYCLE

40 yr 7-8/yr

Per tree, naturally shed. Years 1-7 juvenile; years 8-30 mature, plate-grade; years 31-40 late-life. The leaf is not harvested — it falls.

CAMPCO AGGREGATION

53 yrs 100K+

Central Arecanut and Cocoa Marketing and Processing Co-operative, founded 1973. Stable price, dependable volume, institutional traceability for the plate industry.

CPCRI RESEARCH

55 yrs Vittal

Central Plantation Crops Research Institute. Agronomic research, extension, varietal development. No other origin country has equivalent research anchorage.

CONSERVIA DIRECT PARTNERSHIPS

810 ≈2,000 ha

Practitioner case example. Conservia Partners (Ecodyne Tableware) operates 810 direct farmer partnerships across ≈2,000 ha — a specific operator footprint, not an industry-wide norm.

IMPLICATIONS FOR THE FORECAST

Supply is not the constraint. Conversion is.

Export plate demand consumes a small fraction of available leaf supply on any plausible domestic-consumption assumption. The binding constraint is downstream — certified plant capacity, container-loading discipline, and Western European importer-channel access. Future growth concentrates with operators who hold those, not with those who hold leaf.

CHAPTER SOURCES

Government of India, Horticultural Statistics at a Glance 2022-23 · Indiastat state-level time-series · FAOSTAT corporate statistics · CPCRI (Vittal) · CAMPCO · Conservia Partners practitioner data for direct-partnership figures.

02

ECODYNE RESEARCH

Industry Report 2025-26

First Edition · June 2026

Data refreshed June 2026

CHAPTER TWO · MANUFACTURING & CAPACITY

Process, Tiers, Shocks

An eight-stage manufacturing process, three distinct operating models, a five-tier producer hierarchy. India's installed plate capacity is approximately 80-120 million plates per month — and the FY 2025-26 contraction has exposed which tiers can absorb shocks and which cannot.

“The 10-day loading discipline is not marketing. It is operational truth — standing inventory of three million plates ready to ship, an established container-loading bay, and a tight transporter relationship that gets a container on site within 48 hours of order confirmation. Tier 2 and Tier 3 cannot match it.”

VINAY MANJESHWAR · FOUNDER, ECODYNE TABLEWARE

15+ YEARS IN PALM LEAF EXPORT

IN THIS CHAPTER

02.01	Installed capacity, utilisation, seasonality	p. 14
02.02	The 8-stage manufacturing process	p. 15
02.03	Three operating models — export, hybrid, domestic	p. 15
02.04	The five-tier producer hierarchy and the two shocks	p. 16

This chapter draws on practitioner interviews, Tier 1 manufacturer disclosures, the Ecodyne 8-stage process documentation, and the two-shock analysis for FY 2025-26.

80–120 million plates per month installed. Demand peak runs 2.5× the trough.

India's installed palm leaf plate capacity runs 80–120 million plates per month. Industry shipment in FY 2024-25 was approximately 170 million plates — an average of ≈14M/month. Capacity is not the constraint; destination-channel demand is. Alongside the export trade, an unofficial GSTN-registered domestic market of roughly US\$ 55.6M provides a price-sensitive demand floor.

INSTALLED CAPACITY (INDUSTRY)	CAPACITY UTILISATION (FY24-25)	SEASONAL DEMAND SWING	SOLAR-POWERED OPERATORS
80–120M	≈14%	2.5×	1
Plates per month, all tiers. Tier 1 ≈ 30–45M; Tier 2 ≈ 30M; Tier 3 + Tier 4 ≈ 35M.	Average monthly shipment / installed capacity. Structurally under-utilised — demand-bound, not supply-bound.	Peak month / trough month. Q4 calendar (Sep–Nov) peak for EU festive procurement; Feb–Apr trough.	Conservia Partners — the sole Indian palm-leaf-plate operator on full solar power. Sector-wide adoption is effectively zero.

WHAT THIS
MEANS

The industry runs at well under 20% of installed capacity. The binding constraint is not the press, the dryer, or the leaf — it is the importer channel and the certified buyer relationship. Tier 1 plants that already hold those channels can absorb 3–5× volume growth without capex.

The industry's manufacturing footprint is materially larger than its shipment numbers suggest. A typical Tier 1 plant operates 4–8 hydraulic presses, each running 2,000–3,000 cycles per shift, with single-press output of roughly 800,000 plates per month at full utilisation. Supporting infrastructure — leaf cleaning, soaking tanks, drying chambers, UV sterilisation, QC and packing — scales to match. Across the Karnataka cluster's 5–7 Tier 1 and 15–20 Tier 2 operators, aggregate installed capacity sits comfortably

above 100 million plates per month. The FY 2025-26 contraction does not reflect a supply constraint; it reflects a demand collapse in a single jurisdiction running parallel to a structural channel shift toward European certified procurement. On the domestic side, the registered market — sized here from unofficial GSTN registered-outward-supply statistics at roughly US\$ 55.6M and read strictly as a floor rather than a ceiling — has been broadly flat as bagasse substrates compressed price points.

FIG. 2.1 · THE 8-STAGE MANUFACTURING PROCESS

Tier 1 export-grade process · Ecodyne process documentation

From shed leaf to palletised export carton: eight stages, two temperature-critical.

The press (200°C) and the industrial dryer (60°C for 24 hours) are the cosmetic-grade and food-contact-compliance determinants. Tier 1 plants control both with closed-loop monitoring.



01

Stages 5-6 separate Tier 1 from Tier 3.

Press temperature control and industrial drying are capex-intensive. Tier 3 operators run open-air sun drying — cosmetic and moisture inconsistency drops them out of Western European procurement.

02

Stage 7 (UV) is regulatory.

Food-contact surface sterilisation is non-negotiable for LFGB and EU 1935/2004 compliance. Without it, the product cannot enter the German channel.

03

Stage 8 (QC + pallet) is reputational.

The 10-day loading guarantee depends on standing-inventory discipline at this stage. Three million plates ready to ship is the operating benchmark.

Three operating models — and only one survives the new channel mix.

MODEL A — TIER 1 EXPORT

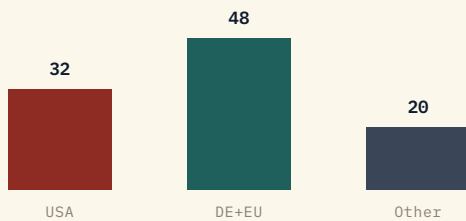
Export-Integrated

FULL CERTIFICATION STACK • MULTI-PRESS •
STANDING INVENTORY

5–7 ops

- **Capacity 3–6M plates/month per site.** Multi-press hydraulic lines, industrial drying chambers, UV sterilisation, palletised packing.
- **Cert stack 7–12 standards.** ISO 9001/14001, LFGB, EU 1935/2004, FDA GRAS, BSCI/Sedex, EN 13432, USDA BioPreferred.
- **Direct EU importer relationships.** 5–10 year relationships with German/Dutch/UK certified importers; multi-quarter forecast horizons.
- **10-day loading guarantee.** Standing inventory + container-bay infrastructure + transporter relationship; 1% per day delay penalty offered.

MODEL A — WESTERN EUROPEAN SHARE OF REVENUE



MODEL B + C — HYBRID & DOMESTIC

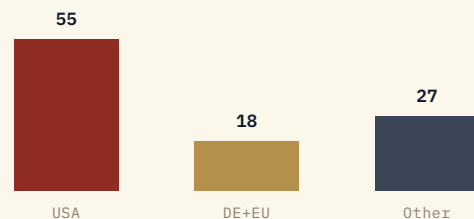
Hybrid / Domestic

PARTIAL CERT • SINGLE-PRESS • SPOT-PROCUREMENT
EXPOSURE

15–60+

- **Tier 2 Hybrid (Model B).** 1–3M plates/month. Partial certification (typically ISO + LFGB). Mixed export + domestic; US channel-dependent for export.
- **Tier 3 Domestic Plus (Model C).** Sub-million per month. Selective export via aggregators or long-tail destinations. Limited certification.
- **Tier 4 Cottage.** Small-format, almost entirely domestic. Indian PWM 2022 demand pull. Below export-grade quality threshold.
- **The 2025-26 vulnerability.** Tier 2 and Tier 3 operators with US revenue exposure absorbed the tariff shock with no Western European fallback; several paused production.

MODELS B+C — USA SHARE OF REVENUE



Channel mix is destiny.

Where each model's revenue comes from

MODEL A — WESTERN EUROPE-WEIGHTED • INSULATED

MODELS B+C — US-WEIGHTED • EXPOSED

The destination mix that defines each model is precisely what the FY 2025-26 shock repriced — and only Model A held.

The five-tier producer hierarchy — and the two shocks that hit it.

TIER 1 EXPORT-INTEGRATED

5–7 **≈40%**

Multi-cert · multi-press · German channel. 3–6M plates/month per site; holds the Western European certified importer relationships. Insulated from the FY 2025-26 US shock by destination mix.

TIER 2 EXPORT-CAPABLE

15–20 **≈30%**

Partial cert · single-press · US-exposed. 1–3M plates/month. Most exposed to the FY 2025-26 US tariff shock and the bagasse domestic shock simultaneously.

TIER 3 DOMESTIC PLUS

35–50 **≈20%**

Selective export · long-tail destinations. Sub-million per month, limited certification. Some FY 2025-26 contraction; some operators paused.

TIER 4 + TIER 5 COTTAGE

60+ **≈10%**

Domestic-only · PWM 2022 demand pull. Small-format. The Indian single-use-plastic ban created sustained pull through 2022-26; insulated from the export shock entirely.

IMPLICATIONS FOR THE FORECAST

The shocks favour Tier 1 — and accelerate consolidation.

FY 2025-26 brought two shocks at once: the US tariff compressing export demand, and bagasse cost-erosion eroding domestic price points. Tier 1 absorbed both via European certified channels; Tier 2 and Tier 3 absorbed neither. The forecast horizon to FY 2028-29 anticipates Tier 1 share of total output rising from ≈ 40% to 50–55% — a structural consolidation, not a transitory one.

CHAPTER SOURCES

Practitioner interviews and Tier 1 manufacturer disclosures · Ecodyne process documentation (8-stage specification) · CPCRI plant-operations research · capacity benchmarking and shipment-level container data from Volza Grow · two-shock analysis for FY 2025-26 (US tariff + bagasse cost erosion).

03

ECODYNE RESEARCH

Industry Report 2025-26

First Edition · June 2026

Data refreshed June 2026

CHAPTER THREE · EXPORTS & TRADE FLOWS

The Nine-Year Trajectory

From US\$ 10.6 million in FY 2017-18 to a US\$ 28.04 million peak in FY 2023-24; FY 2024-25 eased to US\$ 26.73 million, just below the peak — then a 25% contraction to US\$ 20.12 million (provisional) in FY 2025-26. The nine-year arc tells the whole story: structural expansion, peak, single-jurisdiction shock, reset.

“The FY 2023-24 high was the ceiling; FY 2024-25 held just beneath it. Strip out the US single-shock and the industry's underlying trajectory through FY 2025-26 was approximately flat to modestly positive — Western Europe absorbing the demand the US shed.”

ECODYNE RESEARCH · TRADE-FLOW ANALYSIS

JUNE 2026

IN THIS CHAPTER

03.01	The nine-year value trajectory	p. 18
03.02	Pricing tiers — premium, mainstream, volume	p. 19
03.03	Physical flow, all-goods share, the FY 26 waterfall	p. 20
03.04	What the trajectory means for the forecast	p. 20

This chapter draws on TradeStat / DGCI&S monthly export records (HS 46021919 + HS 46021990 combined), Volza Grow shipment-level data, and Reserve Bank of India foreign-trade publications for the all-goods denominator.

A 165% expansion to the FY 2023-24 peak, then a 25% single-year shock.

The industry expanded from US\$ 10.6M in FY 2017-18 to a US\$ 28.04M peak in FY 2023-24. FY 2024-25 held just below at US\$ 26.73M; FY 2025-26 (provisional) then reset to US\$ 20.12M — a –24.7% contraction concentrated in a single bilateral flow.

PEAK (FY 2023-24)

\$28.04M

Nine-year high. EU SUP Directive enforcement + US post-pandemic recovery converged. FY 2024-25 held just below at \$26.73M.

FY 2025-26 (PROV.)

\$20.12M

≈115M plates · ≈350 containers. USA –43% accounts for 72% of the contraction.

9-YR CAGR (17-18→25-26)

+8.3%

Through-shock structural rate including the FY 2025-26 trough; the ex-shock trajectory runs ≈ 11%.

EX-US GROWTH (FY 25-26)

≈ flat

Western Europe + ROW combined. The contraction is jurisdiction-specific; non-US destinations broadly stable.

WHAT THIS MEANS

The trajectory shows a structurally growing industry that absorbed a single-year, single-jurisdiction shock. Read the trend on the ex-USA series and the underlying demand growth is intact. The FY 2025-26 figure is a tariff event, not a market-size event.

Nine years of combined HS 46021919 + HS 46021990 trade data establishes the structural baseline. The expansion phase (FY 2017-18 to FY 2019-20) reflected initial EU and US institutional discovery of palm leaf as a compostable food-contact substrate. The COVID cycle (FY 2020-21 to FY 2021-22) saw flat-to-modest growth as catering demand suppressed across destinations. The recovery phase (FY 2022-23 to FY 2023-24) saw EU

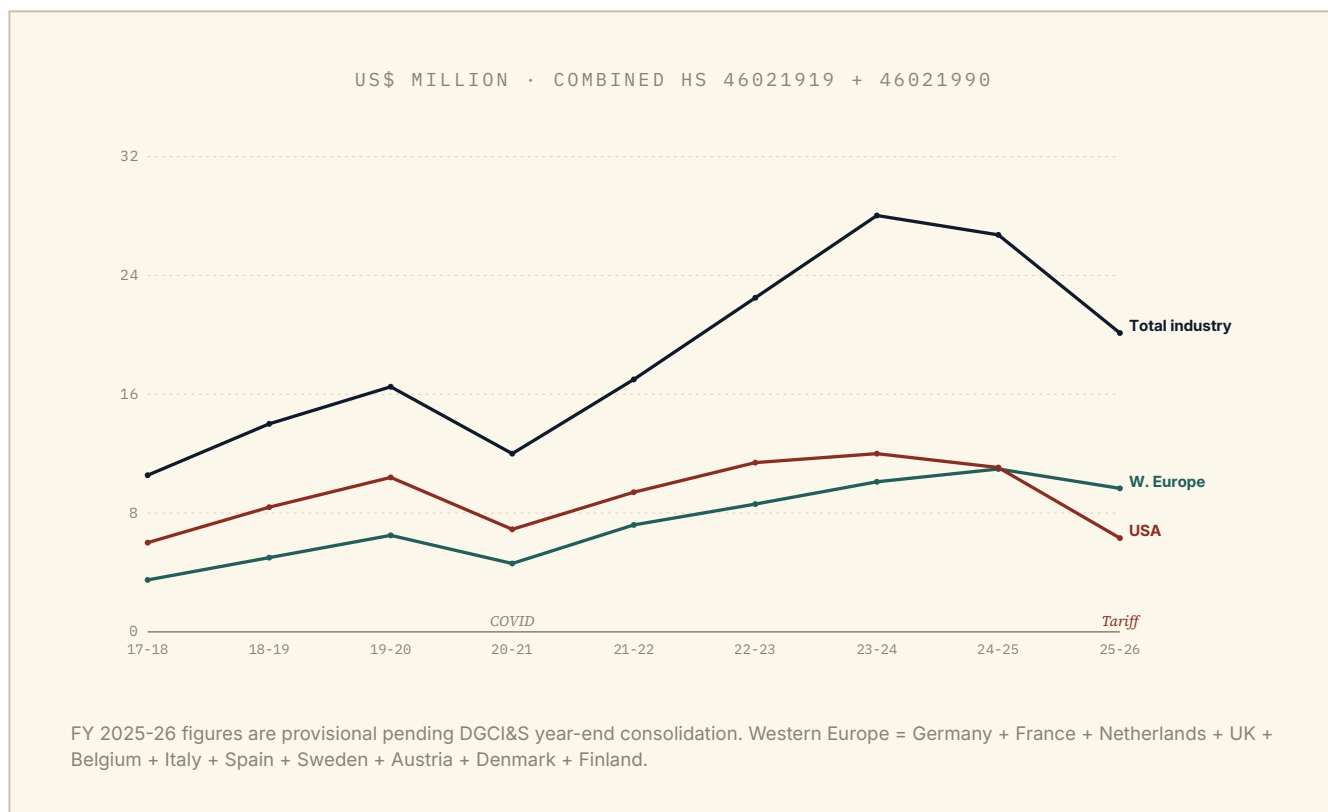
SUP Directive enforcement and the US post-pandemic catering recovery converge to produce the FY 2023-24 all-time high; FY 2024-25 held just beneath it. The FY 2025-26 contraction is structurally exogenous — the IEEPA tariff regime and the FDA classification action both originated in US policy during the August 2025 to February 2026 window. The contraction does not generalise to other destination markets.

FIG. 3.1 • NINE-YEAR VALUE TRAJECTORY

US\$ M • FY 2017-18 → FY 2025-26 (prov.) • TradeStat

The expansion is structural. The contraction is exogenous.

The nine-year arc peaks in FY 2023-24 and resets 25% in FY 2025-26, concentrated entirely in the US bilateral flow. Western Europe was flat-positive through the shock.



01

The expansion phase was multi-year.

FY 2017-18 to FY 2019-20 saw ~95% growth as European institutional procurement discovered palm leaf as the only fully-compostable food-contact substrate.

02

COVID was a single-year dip.

The FY 2020-21 contraction recovered fully within two years as catering demand returned. Catering-demand suppression is preceded — not a new phenomenon.

03

The 2025-26 shock is US-only.

Strip out the US bilateral flow and total trade through FY 2025-26 is approximately flat. The structural demand thesis is intact.

Three pricing tiers — premium, mainstream, volume.

PREMIUM TIER

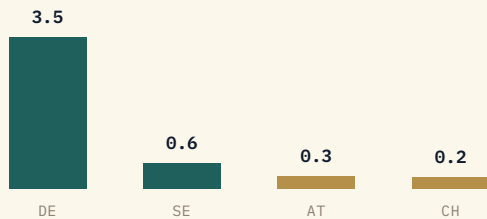
Premium

GERMANY • SWEDEN • AUSTRIA • SWITZERLAND • NORWAY

Certified, branded

- **Premium destination buyers.** Pay for certification depth (LFGB + EN 13432 + BSCI) and 10-day loading reliability.
- **Branded SKUs.** Often carried under certified European importer brands. Premium pricing supports the certification stack and ESG documentation cost.
- **Tier 1 manufacturers only.** Premium-tier procurement requires the full certification stack; Tier 2 cannot service this channel at scale.
- **Stable through FY 2025-26.** Germany +9%, Sweden +27% — the structural anchor of industry value.

PREMIUM TIER • TOP DESTINATIONS (US\$ M)



VOLUME TIER

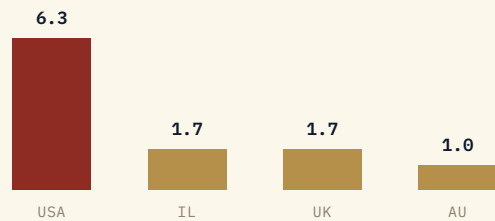
Volume

ISRAEL • USA MAINSTREAM • UK SUPERMARKET

Commodity + B-grade

- **Volume-channel buyers.** Compete on price in commodity catering and supermarket private-label channels.
- **Israel as B-grade absorption.** Absorbs cosmetic-second yield from Tier 1 and Tier 2 plants — critical for industry yield economics.
- **US mainstream volume channel.** Pre-tariff the largest volume buyer; the tariff compressed margins below the sustainable point for Tier 2 operators.
- **Australia / Canada secondary tier.** Sits between premium and volume on price.

VOLUME TIER • TOP DESTINATIONS (US\$ M, FY 25-26)



The mainstream middle.

Pricing-tier composition of FY 2025-26 industry value

PREMIUM • CERTIFIED EU • ~24%

MAINSTREAM • EU/UK/NL/FR • ~41%

VOLUME • COMMODITY + B-GRADE • ~35%

The tier mix shifted toward premium through FY 2025-26 as US-volume contraction shrank the volume tier and Germany growth expanded the premium tier. The premium-tier share rises further through the forecast horizon. Per-plate pricing is held as internal methodology and is not published on report surfaces.

Physical flow, share of all-goods, the FY 2025-26 waterfall.

CONTAINER FLOW

510 → 350 **−31%**

FY 24-25 → FY 25-26, 40-ft containers. Physical flow tracks the dollar contraction closely. Most-affected routing: Mangalore-to-US West Coast; EU-direct routings held flat.

MIX SHIFT

→ premium **FY 25-26**

Even as volume fell, the destination mix shifted toward premium-tier Western European procurement and away from the volume-tier US channel.

SHARE OF INDIA ALL-GOODS

0.0046% **of \$441.7B**

FY 25-26 all-merchandise exports. Strategically significant but fiscally a sub-0.01% sliver of total Indian merchandise trade. The industry's importance is structural, not fiscal.

FY 26 WATERFALL

USA = 72% **of change**

USA −\$4.75M; Israel −\$0.54M; UK −\$0.13M; AU −\$0.08M. Germany +\$0.28M; Belgium +\$0.07M; Sweden +\$0.05M. The USA alone explains nearly three-quarters of the year-on-year change.

IMPLICATIONS FOR THE FORECAST

The trade map will not return to its FY 2024-25 shape in any scenario.

The central case projects FY 2028-29 industry value at US\$ 26.5M — recovering approximately to the FY 2024-25 level but with a permanently different destination composition. Western Europe permanently exceeds the US in regional share; Tier 1 share of total output rises; the Tier 2-3 layer thins through consolidation.

CHAPTER SOURCES

TradeStat / DGCI&S — combined HS 46021919 + HS 46021990, monthly publications through Mar 2026 provisional · Volza Grow — shipment-level export records for destination and container detail · UN Comtrade — destination-side mirror import data · Reserve Bank of India — all-goods export totals.

04

ECODYNE RESEARCH

Industry Report 2025-26

First Edition · June 2026

Data refreshed June 2026

CHAPTER FOUR · DESTINATION GEOGRAPHY

Destination Markets

A single jurisdiction caused seventy-two percent of FY 2025-26's contraction. Another quietly grew nine percent through the same window. The destination map of the world's only export-grade palm leaf plate industry has been permanently re-weighted.

“The German importer base buys on certification quality, container reliability, and dedicated manufacturer relationships built over five to ten years. These attributes are not transferable to a US recovery in a matter of months.”

VINAY MANJESHWAR · FOUNDER, ECODYNE TABLEWARE

15+ YEARS IN PALM LEAF EXPORT

IN THIS CHAPTER

04.01	The United States — dual-shock contraction	p. 22
04.02	Germany — the counter-cyclical anchor	p. 23
04.03	Western Europe overtakes the United States	p. 22
04.04	Israel, the OECD secondary tier, and the long tail	p. 24

This chapter draws on TradeStat / DGCI&S, FAOSTAT, Volza, and UN Comtrade destination-side reciprocal data.

One country fell. Another rose. The map was redrawn.

The United States accounted for 72% of the industry's FY 2025-26 contraction. Germany, the only major destination to grow through the same window, posted +9%. Western Europe overtook the United States as the largest regional destination by value — a structural reweighting, not a transitory one.

USA · Δ FY 25-26

-43%

US\$ 11.06M → 6.31M. IEEPA tariff + FDA classification action compressed a single bilateral flow.

GERMANY · Δ FY 25-26

+9%

US\$ 3.23M → 3.51M. EU SUP Directive pull; LFGB / EN 13432 procurement core.

W. EUROPE REGIONAL SHARE

48%

FY 24-25: 41% → FY 25-26: 48%. Crosses the United States to become the industry's largest regional buyer.

INDIA POST-TARIFF SHARE

48%

Of remaining US substitute volume. Sri Lanka 34%, China 7%, others 11%. The cultivation moat held.

WHAT THIS MEANS

The FY 2025-26 signal is not consumer-demand softening. It is a single-jurisdiction policy shock running parallel to a structural channel shift toward certified European procurement. The contraction does not generalise; the reweighting does.

Five top-20 destinations grew in FY 2025-26: Germany (+9%), Belgium (+15%), Sweden (+27%), China (+46% from a small base), and Malaysia (+14%). The growth concentration in mature European certification-driven markets is the interpretive datapoint for the year. Tier 1 manufacturers holding multi-year German importer relationships were largely insulated

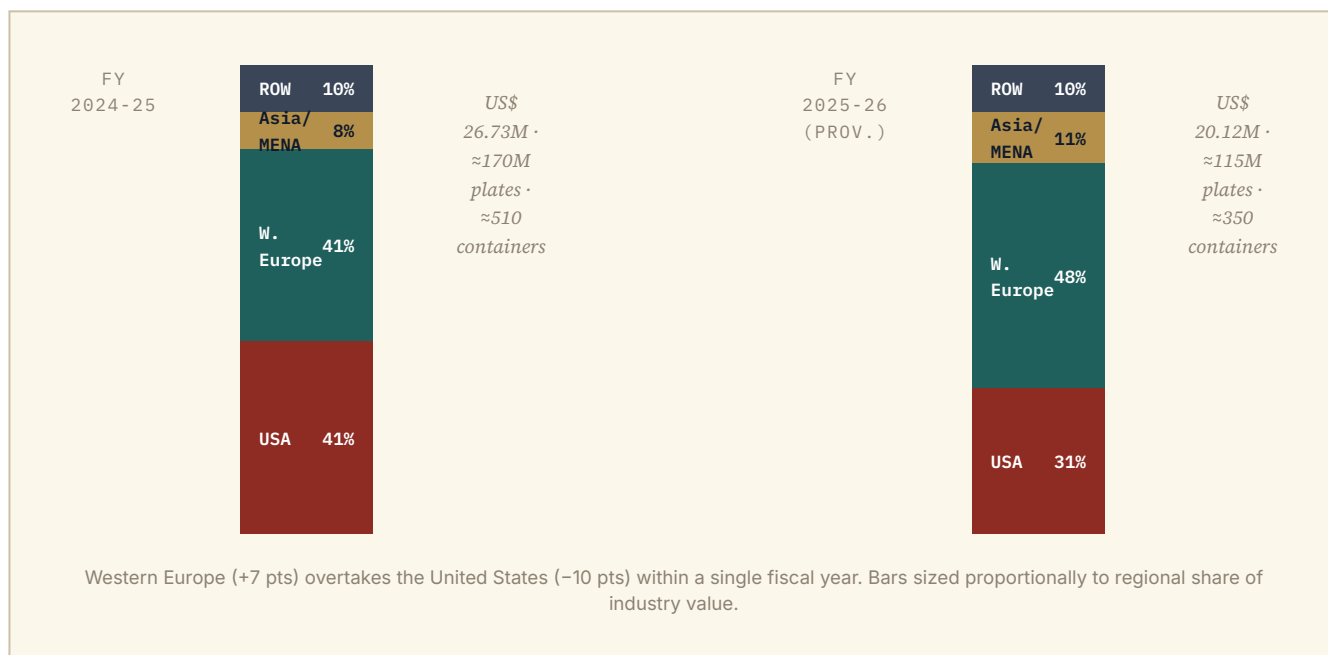
from the US shock; Tier 2 and Tier 3 operators dependent on the US channel were not. Beneath the headline, the FY 2025-26 contraction is as much an industry-structure event as a destination-market event — one whose ripple through the manufacturer tier will define the FY 2027-29 horizon.

FIG. 4.1 · REGIONAL DESTINATION SHIFT

FY 2024-25 → FY 2025-26 (provisional)

Western Europe overtakes the United States as the industry's largest regional destination.

The regional reweighting is not subtle. European premium-channel demand absorbed share lost from US contraction within a single fiscal year.



01

The reweighting is structural.

Western Europe will not return to a sub-US share in any forecast scenario through FY 2028-29. The realignment crystallised in a single year but reflects two years of channel migration.

02

The US contraction is jurisdiction-limited.

Both shocks — the IEEPA tariff regime and the FDA classification action — apply only to US imports. The signal does not generalise and is partially reversible as tariff rates moderate.

03

The cultivation moat held.

Where US buyers continued sourcing through peak tariff pressure, India retained 48% of substitute volume. No alternative origin can replicate the cultivation base within a multi-year horizon.

The shock and the anchor, examined side by side.

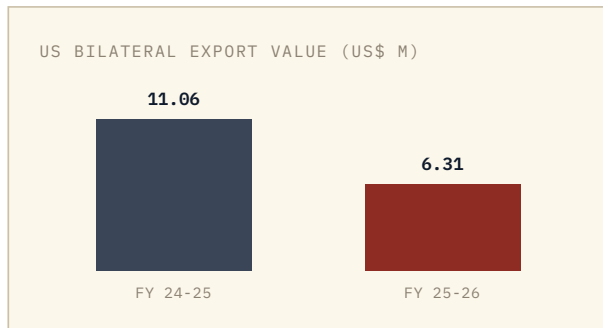
THE SHOCK

United States

LARGEST SINGLE DESTINATION · DUAL-SHOCKED

–US\$ 4.75M

- **IEEPA tariff regime.** Combined effective rate $\approx$ 50% on HS 4602 from late Aug 2025 through 7 Feb 2026; reduced to $\approx$ 18% thereafter.
- **FDA classification action.** Jurisdiction-limited to US food-contact import regulation. May 2025 GRAS notice GRN 1281 remains in effect.
- **Container reroute.** Tier 1 suppliers redirected US-bound containers to European warehouses through late 2025 to avoid demurrage.
- **Partial recovery path.** 18% tariff is plate-economics-marginal; further moderation to $\approx$ 10% would restore $\sim$ 60% of FY 2024-25 volume.



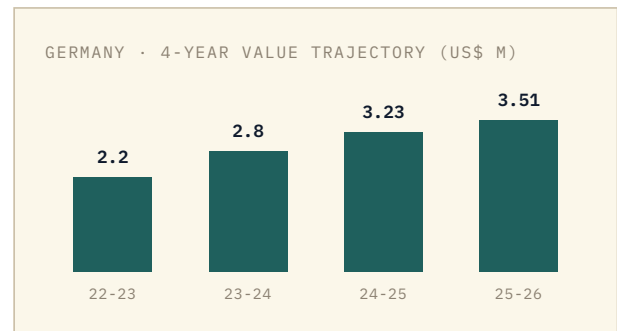
THE ANCHOR

Germany

ONLY MAJOR DESTINATION TO GROW · COUNTER-CYCLICAL

+US\$ 0.28M

- **EU SUP Directive pull.** Directive 2019/904 removed competing plastic substrates from food-service by mid-2021. Demand is regulatorily induced, not discretionary.
- **Certification-led procurement.** LFGB §30/§31 testing, EN 13432 industrial-compostability, and BSCI social audit are non-negotiable buyer requirements.
- **Multi-year importer relationships.** Long-standing certified German importers run 5- to 10-year relationships with Tier 1 Indian manufacturers.
- **Not price-driven.** Buyers compete on certification documentation and 10-day loading reliability, not spot procurement.



Where the US shock met the supply side.

Origin share of remaining US import volume, FY 2025-26



India retained dominant share even at peak tariff pressure. The cultivation and capacity moat — 62.4% of world cultivation, 98% of world plate exports — cannot be replicated by any alternative origin within a multi-year horizon.

The rest of the map: secondary tiers, the long tail, and what it implies.

ISRAEL

-24% **\$1.74M**

The B-grade absorption channel. Israeli B-grade importers absorb cosmetic-second yield from Tier 1 and Tier 2 plants. A yield-optimisation channel, not a margin channel — without it, A-grade plant economics would be materially weaker.

AUSTRALIA & CANADA

-7% **\$1.81M**

Combined · OECD secondary · certification-driven. SUP-ban regulatory pull (SA, ACT, QLD, WA, VIC; CEPA Schedule 1). Long-term growth candidates as state-level bans expand.

W. EUROPE PEERS

+2% **\$6.40M**

FR · NL · BE · UK · ES · IT · SE · AT · DK · FI. Belgium +15%, Sweden +27%, France growing; UK -7%, Netherlands -3%. Bloc-wide stability through the US contraction is the second confirming signal.

THE LONG TAIL

≈ flat **\$1.80M**

80+ destinations · 9% of industry value. An optionality, not a current-year driver. Promotion candidates for FY 2027-30: Saudi Arabia hospitality, UAE catering, Singapore institutional, South Africa retail.

IMPLICATIONS FOR THE FORECAST

Two structural conclusions for FY 2026-29.

First, the destination map will not return to its FY 2024-25 shape in any of the three forecast scenarios — Western Europe at 45-55% of industry value through FY 2028-29 is the baseline, not the upside. Second, the Tier 1 manufacturer share of total output rises across all three scenarios: the channel access, certification stack and loading discipline that define Tier 1 are precisely the attributes the new destination map rewards.

CHAPTER SOURCES

TradeStat / DGCI&S (HS 46021919 + HS 46021990 combined, monthly through Mar 2026 provisional) · Volza Grow shipment-level records · UN Comtrade destination-side mirror data · US Customs and Border Protection IEEPA tariff guidance · US FDA GRAS Notice GRN 1281 (May 2025) · European Commission Directive (EU) 2019/904.

05

ECODYNE RESEARCH

Industry Report 2025–26

First Edition · June 2026

Data refreshed June 2026

CHAPTER FIVE · LOGISTICS & SHIPPING

Containers, Ports, Discipline

Three ports handle the entire industry's outbound flow. A 40-foot container is volume-bound — it cubes out long before it weighs out. The 10-working-day loading guarantee separates Tier 1 from the rest. And the Red Sea reroute added ten days and a quarter of bunker cost to every European voyage.

“European institutional buyers procure on twelve-to-twenty-four-week forecast horizons but expect committed loading dates that hold within a five-business-day window. The 10-day Tier 1 guarantee is one of the principal reasons certified European importers continue to source from Indian manufacturers rather than developing alternative origins.”

VINAY MANJESHWAR · FOUNDER, ECODYNE TABLEWARE

15+ YEARS IN PALM LEAF EXPORT

IN THIS CHAPTER

05.01	Container volume — physical flow alongside dollar contraction	p. 26
05.02	Three gateway ports — Mangalore, Nhava Sheva, Chennai	p. 26
05.03	Pre-Red Sea vs Cape rerouting — freight under pressure	p. 27
05.04	Container economics, inland haul, the 10-day discipline	p. 28

This chapter draws on Volza shipment-level container records, port authority data (NMPT, JNPT, Chennai Port), and freight benchmarking via the Drewry World Container Index.

≈510 containers in FY 2024-25. ≈350 in FY 2025-26. The physical flow shrank with the dollar flow.

Industry-wide container volume contracted from approximately 510 forty-foot containers in FY 2024-25 to approximately 350 in FY 2025-26 — a ≈31% contraction tracking the dollar contraction closely. Most-affected routing: Mangalore-to-US West Coast.

FY 24-25 CONTAINERS

≈510

40-ft equivalent · all routings. Physical flow tracks the dollar flow one-for-one.

FY 25-26 CONTAINERS

≈350

–31% YoY. Mangalore–Long Beach the most-affected single routing.

LOADING BASIS

Volume-bound

Containers cube out before they weigh out. Plate density makes outbound flow space-limited, not weight-limited.

10-DAY LOADING GUARANTEE

1% / day

Delay penalty offered by Tier 1. Standing inventory + transporter relationship + loading-bay infrastructure.

WHAT THIS MEANS

Logistics is structurally embedded in industry economics. The 10-day loading guarantee is not service-level marketing — it is a tier-discriminating operational reality that European institutional buyers price into the procurement decision. Tier 2 and Tier 3 operators cannot match it without standing inventory and dedicated container-bay infrastructure.

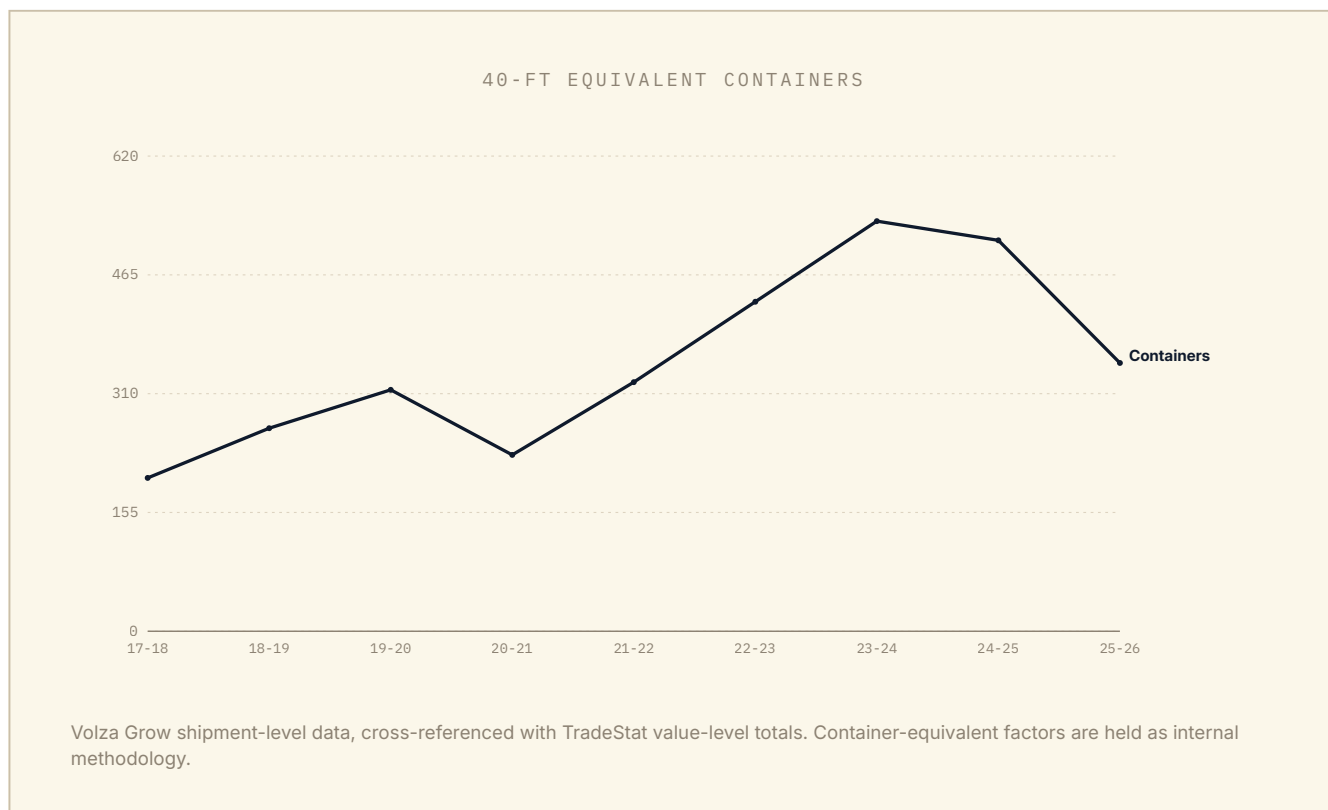
A single export container carries roughly US\$ 35,000–40,000 in FOB value at industry-average pricing. Ocean freight from Mangalore to Hamburg ran at approximately US\$ 1,800 per 40-foot container in late 2023 (post-pandemic normal), spiked to US\$ 4,200 during peak Red Sea disruption in mid-2024, and settled at US\$ 2,800–3,200 through FY 2025-26 — approximately 6–8% of CIF value. Inland haulage from Karnataka cluster

plants to Mangalore typically runs ₹35,000–50,000 (US\$ 420–600) per container, around 1.5% of container CIF value. The inland-haul cost differential between Karnataka cluster operators shipping ex-Mangalore and Tamil Nadu operators trucking raw leaf from Karnataka and shipping plates ex-Chennai is one of the persistent reasons the Tamil Nadu manufacturing base has not displaced Karnataka.

FIG. 5.1 • CONTAINER FLOW • 9-YEAR ARC 40-ft equivalent containers • FY 2017-18 → FY 2025-26 (prov.)

Physical flow tracks dollar flow. Container volume mirrors the FY 2025-26 contraction one-for-one.

Container counts move in close lockstep with industry dollar value. The ~31% container contraction in FY 2025-26 matches the 25% dollar contraction adjusted for mix-shift toward higher-value premium European destinations.



01

Mangalore is the dominant gateway.

≈ 55% of industry container volume routes through New Mangalore Port Trust (NMPT) — the shortest inland haul from the Karnataka manufacturing cluster.

02

Nhava Sheva is the European specialist.

≈ 30% of containers route through Jawaharlal Nehru Port (JNPT, Mumbai) — preferred for deeper liner-service networks into Antwerp, Hamburg, Rotterdam, Felixstowe.

03

Chennai serves Southeast Asia & Australia.

≈ 15% of containers; principally Tamil Nadu manufacturers serving Singapore, Malaysia, Australia, and Middle East routings.

Pre-Red Sea baseline vs Cape rerouting — shipping under pressure.

PRE-RED SEA BASELINE

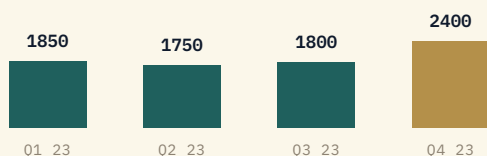
Pre-Q4 2023

SUEZ-ROUTED • POST-PANDEMIC NORMAL • STABLE FREIGHT

US\$ 1,800

- **Suez Canal routing.** Standard Asia-to-Europe transit via Suez. Mangalore-to-Hamburg transit time ≈ 24–28 days.
- **Stable spot freight.** US\$ 1,800–2,200 per 40-ft container. Predictable for multi-quarter procurement planning.
- **Liner service density.** Maersk, MSC, CMA CGM, Hapag-Lloyd all ran direct or one-transhipment Asia-Europe services.
- **Bunker cost stable.** Within ±10% of trailing-12-month average; Tier 1 plants locked annual freight contracts at predictable rates.

PRE-RED SEA • MANGALORE-HAMBURG (US\$/40FT)



CAPE REROUTING ERA

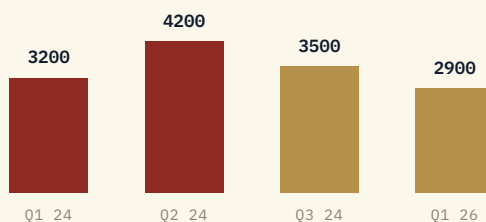
Q1 2024 →

CAPE OF GOOD HOPE • +10–14 DAYS • +25–35% BUNKER

US\$ 2,800–4,200

- **Houthi disruption.** Attacks on commercial shipping in the southern Red Sea and Bab el-Mandeb strait from late 2023; persistent through 2024–25.
- **Major liner reroute.** Maersk, MSC, CMA CGM, Hapag-Lloyd diverted Asia-Europe services around the Cape of Good Hope.
- **Transit time +10–14 days.** Mangalore-to-Hamburg extended to 35–42 days; planning horizons lengthened materially.
- **Bunker cost +25–35%.** Spot freight peaked at US\$ 4,200 mid-2024; settled at US\$ 2,800–3,200 through FY 2025-26.

CAPE ERA • MANGALORE-HAMBURG (US\$/40FT)



The two pressures compounded but did not cause the FY 2025-26 contraction.

FY 2025-26 cost-stack (illustrative, Mangalore-Hamburg)

PLATE FOB COST 76%

FREIGHT 8% MARGIN 14%

Even at peak Red Sea pressure, ocean freight remained 6–8% of CIF cost — material but not structurally dominant. The FY 2025-26 contraction was caused by the US tariff shock, not by freight. Freight added secondary margin compression, fully absorbed in the central forecast case.

Container economics, gateway choice, the 10-day discipline.

MANGALORE (NMPT)

55% Dominant

Karnataka cluster · 30–50 km inland haul. Shortest-haul gateway, used by all Tier 1 Karnataka operators. US West Coast routings via Singapore transshipment.

CHENNAI

15% Regional

Tamil Nadu base · Southeast Asia + Australia. Principal gateway for Tamil Nadu manufacturers; limited European liner service vs Nhava Sheva.

NHAVA SHEVA (JNPT)

30% Specialist

Mumbai · direct European liner network (Antwerp, Hamburg, Rotterdam, Felixstowe). Some Tier 1 manufacturers maintain dual-port discipline.

10-DAY LOADING DISCIPLINE

1%/day Penalty

Tier 1 differentiator · 3M+ standing inventory. 10 working days from order confirmation to bill-of-lading, with 1% per day delay penalty. Tier 2 and Tier 3 cannot match.

IMPLICATIONS FOR THE FORECAST

Logistics is a tier-discriminator, not a commodity input.

European institutional procurement priorities — committed loading dates, multi-quarter delivery reliability, fully-documented chain of custody — favour Tier 1 operators with standing-inventory and bay-infrastructure investment. The Red Sea-era freight environment widened the gap by compressing Tier 2 margins disproportionately. The forecast horizon anticipates continued Tier 1 share gains driven in part by these logistics-discipline differentials.

CHAPTER SOURCES

Volza Grow — shipment-level container data (consignee, shipper, port, container detail) · Drewry World Container Index — freight benchmark FY 2017 through current · NMPT, JNPT, Chennai Port traffic disclosures · Tier 1 manufacturer freight-contract disclosures · S&P Global Platts bunker indices for Cape-route bunker analysis.

06

ECODYNE RESEARCH

Industry Report 2025-26

First Edition · June 2026

Data refreshed June 2026

CHAPTER SIX · REGULATORY FRAMEWORK

The Pull and the Stack

Palm leaf plate demand is regulatorily induced. The EU Single-Use Plastics Directive is the largest pull factor. A 7-to-12 certification stack is the cost of entry. The FDA classification action is jurisdiction-specific. India's PWM 2022 created a parallel domestic pull. The regulatory environment shapes which tier survives.

“Without LFGB, you do not enter Germany. Without EN 13432, you do not enter EU eco-procurement. Without BSCI, you do not enter major European retailers. Without FDA GRAS, you do not enter the US food-service channel. Without the full stack, you are limited to long-tail destinations — and that is no business at scale.”

VINAY MANJESHWAR · FOUNDER, ECODYNE TABLEWARE

15+ YEARS IN PALM LEAF EXPORT

IN THIS CHAPTER

06.01	The 7-to-12 certification stack	p. 30
06.02	EU Single-Use Plastics Directive — the demand anchor	p. 30
06.03	EU regulatory pull vs US trade-policy disruption	p. 31
06.04	UK PPT, Australia state SUP bans, India PWM 2022	p. 32

This chapter draws on European Commission directive registers, US FDA GRAS notice GRN 1281 documentation, UK HMRC PPT guidance, FSANZ Australian food-contact regulation, and the Indian Plastic Waste Management Rules 2022.

A 7-to-12 standard stack. Each entry to a major channel is a separate certification.

Tier 1 Indian manufacturers hold 7 to 12 active certifications. The stack is destination-specific: LFGB for Germany, FDA GRAS for the United States, BSCI/Sedex for European retailers, EN 13432 for eco-procurement. Each is a separate audit, a separate renewal cycle, a separate cost.

CERT STACK (TIER 1)	EU SUP DIRECTIVE SCOPE	GERMAN IMPORTER REQUIREMENT	FDA GRAS SCOPE
7-12 Active certifications across 3+ layers: quality (ISO), food-contact (LFGB+EU+FDA), social (BSCI), compost (EN 13432).	9 Product categories removed — plates, cutlery, stirrers, straws, EPS containers, oxo-degradables, and more.	100% Procurement non-negotiable: LFGB + EN 13432 + BSCI. No Tier 2 substitute pathway exists.	1 GRN 1281 (May 2025). US-jurisdiction only; does not affect EU/UK/IL/AU/CA channels.

WHAT THIS MEANS

The regulatory framework determines tier survival. The stack is too expensive for Tier 3, too complex for Tier 2 to absorb at scale, and is the precondition for premium-tier procurement at Tier 1. The framework is structurally biased toward consolidation — a smaller number of certified operators serving the regulatorily-driven demand.

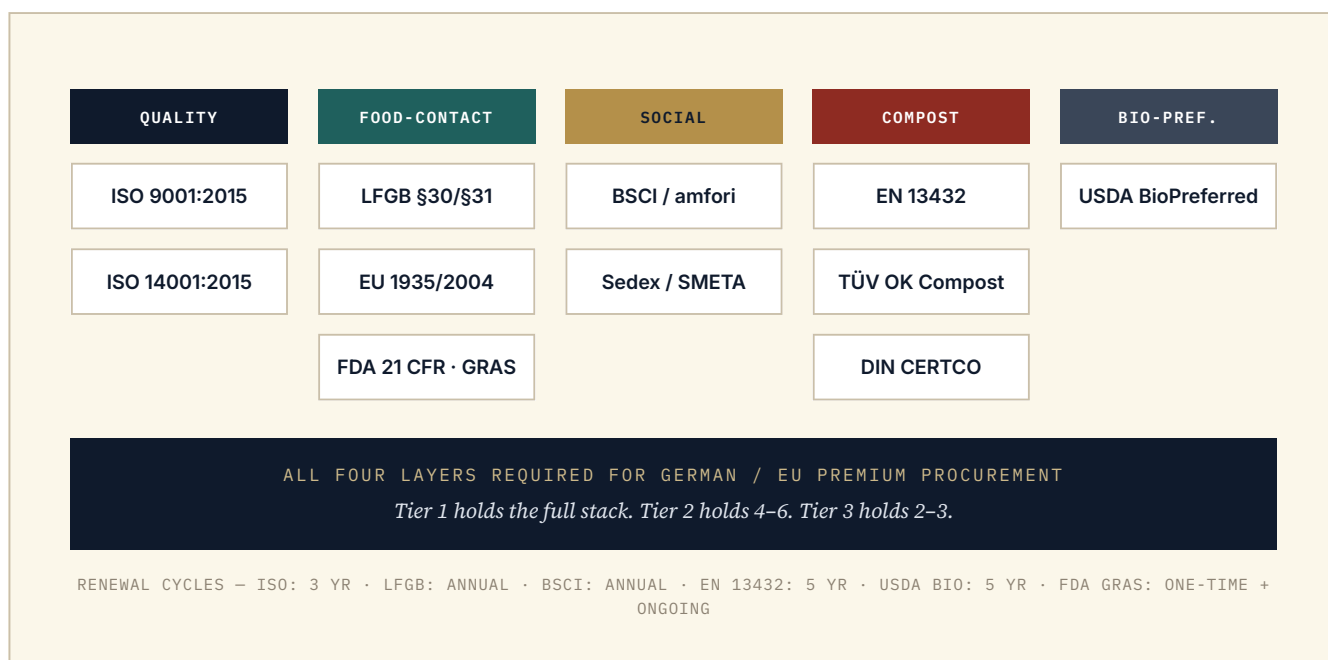
The EU Single-Use Plastics Directive (2019/904) is the largest single pull factor for palm leaf plate demand globally. Adopted in June 2019 with full transposition by member states by July 2021, the Directive removed a wide range of plastic alternatives from food-service applications: expanded polystyrene containers, plastic plates, cutlery, stirrers, straws, and oxo-degradable plastics. These removals created an institutional gap that compostable substrates — palm leaf,

bagasse, PLA, paper — filled. Palm leaf's competitive advantage within that gap is its full EN 13432 industrial-compostability profile achieved without processing inputs, its full LFGB food-contact compliance, and its low substrate carbon footprint. The Directive remains the structural demand anchor for the Western European channel and is the principal reason German demand grew counter-cyclically through the FY 2025-26 US contraction.

FIG. 6.1 · THE CERTIFICATION STACK Four required layers · 7-12 certifications · destination-specific

Four layers, twelve certifications, one survivor tier.

The stack is structured around four functional layers. The full stack is the precondition for Tier 1 export status; holding less restricts the operator to specific channels — and excludes them from the premium German procurement that is the industry's most stable demand pool.



01

Quality + food-contact is the floor.

ISO 9001/14001 + LFGB + EU 1935/2004 are the minimum entry to European institutional procurement. Below this, only long-tail destinations and the domestic channel remain.

02

Social audit is the retailer gate.

BSCI/Sedex is non-negotiable for major European retailer-aligned importers (Carrefour, REWE, Edeka, Ahold-Delhaize, Ocado). Without it, only specialty importers remain accessible.

03

Compostability is the eco-premium.

EN 13432 is achievable; TÜV Austria OK Compost HOME is the demanding upgrade that opens premium home-compostability positioning. Only a subset of Tier 1 manufacturers achieve it.

The EU pull vs the US disruption — opposite directions in the same year.

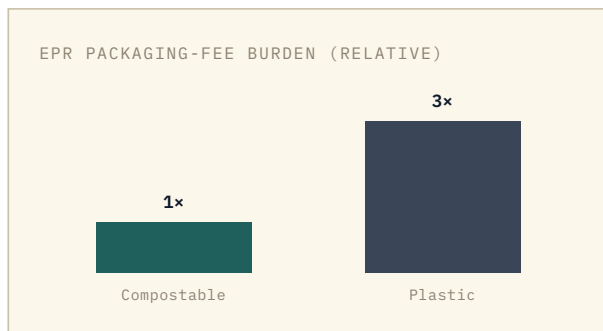
THE EU PULL

Demand Architecture

REGULATORILY INDUCED · MULTI-INSTRUMENT · WIDENING

9 + EPR

- **Directive (EU) 2019/904 — SUP Directive.** Removed plastic plates, cutlery, stirrers, straws, EPS containers and oxo-degradables by July 2021. Created the institutional gap for compostable substitutes.
- **Extended Producer Responsibility.** EPR fees on plastic packaging 2–4× higher than for compostables — an indirect price subsidy for palm leaf and peers.
- **Member-state implementation widening.** Germany, France, Italy, Spain progressively tightening enforcement; eastern member states moving into binding compliance through 2024–26.
- **Stable through FY 2025–26.** Germany +9% growth confirms the pull is structurally intact and independent of US tariff dynamics.



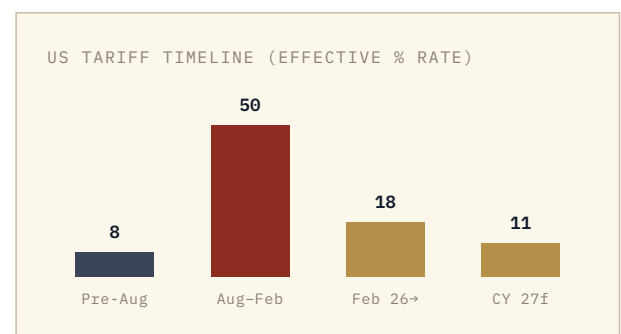
THE US DISRUPTION

Trade Architecture

IEEPA TARIFF + FDA · JURISDICTION-LIMITED · TRANSITORY

50% → 18%

- **IEEPA tariff regime.** Combined effective rate ≈ 50% on HS 4602 plate imports from late Aug 2025 through 7 Feb 2026.
- **Tariff moderation to 18%.** Effective 7 Feb 2026. Reduced but still plate-economics-significant. Forecast assumes further moderation to 8–12% by CY 2027.
- **FDA classification action.** Parallel US-jurisdiction action affecting import clearance. GRAS notice GRN 1281 (May 2025) remains in effect.
- **Jurisdiction-limited.** Both actions apply only to US imports — they do not affect EU, UK, IL, AU, CA or any other destination. The structural demand thesis is unchanged.



Two regulatory architectures, opposite signs.

Demand-creating pull vs jurisdiction-limited disruption

EU PULL · DEMAND-CREATING · WIDENING

US DISRUPTION · JURISDICTION-LIMITED · TRANSITORY

The EU framework creates structural demand; the US action is a single-jurisdiction, time-bound disruption forecast to moderate. The two move in opposite directions in the same fiscal year.

UK, Australia, Canada, India — the regional regulatory map.

UNITED KINGDOM

£223.69/t PPT + EPR

Plastic Packaging Tax 2025-26 (raised from £200/t) on packaging with <30% recycled content; does not apply to palm leaf. UK demand softening (–7%) is more weak-GBP and post-Brexit logistics than weak regulatory pull.

AUSTRALIA

5 states SUP bans

SA · ACT · QLD · WA · VIC. State-level bans staggered 2021–25. Federal FSANZ food-contact framework broadly aligns with EU 1935/2004. Long-term structural growth candidate as bans widen.

CANADA

Federal CEPA + SUP

CEPA Schedule 1 amendments; federal Single-Use Plastics Prohibition Regulations (SOR/2022-138) in effect since December 2022. Municipal procurement preferences expanding through FY 2027-28.

INDIA · DOMESTIC

PWM 2022 Domestic pull

Plastic Waste Management Rules 2022 prohibit plastic cutlery, plates, cups, straws and stirrers nationwide (Tamil Nadu since Jan 2019). Sustained domestic pull through 2022-26 insulates Tier 4 cottage operators from export-channel shocks.

IMPLICATIONS FOR THE FORECAST

Regulation is the structural demand. Tariff is the transitory disruption.

The regulatory architecture is overwhelmingly demand-creating: EU SUP Directive, UK PPT/EPR, Australian state bans, Canadian SUP regulations, and Indian PWM 2022 all generate sustained pull for compostable substrates. The single material disruption — the US IEEPA tariff regime — is jurisdiction-limited and forecast to moderate. The central case projects further EU EPR convergence and additional national SUP bans contributing 4–6% incremental annual demand.

CHAPTER SOURCES

European Commission — Directive (EU) 2019/904 and member-state implementation registers · UK HMRC — Plastic Packaging Tax guidance 2025-26 and EPR documentation · US FDA — GRAS Notice GRN 1281 (May 2025) and 21 CFR §170.30 · US Customs and Border Protection — IEEPA tariff guidance through 2025-26 · FSANZ — food-contact regulation · GoI MoEFCC — Plastic Waste Management Rules 2022.

07

ECODYNE RESEARCH

Industry Report 2025-26

First Edition · June 2026

Data refreshed June 2026

CHAPTER SEVEN · INDUSTRY FORECAST

FY 2026-29 Outlook

Three scenarios — Best, Central, Bear — converge on one structural conclusion: the destination map will not return to its FY 2024-25 shape. The central case projects US\$ 26.5M by FY 2028-29, a 9.8% CAGR from the trough. The best case reaches US\$ 29M with full US recovery. The bear case caps at US\$ 21.5M.

“The forecast horizon is not about whether the industry recovers. It is about which tier captures the recovery. The destination map favours Tier 1 in all three scenarios — channel access, certification stack, and loading discipline are precisely the attributes the new map rewards.”

ECODYNE RESEARCH · FORECAST SCENARIOS

JUNE 2026

IN THIS CHAPTER

07.01	Three scenarios — Best, Central, Bear	p. 34
07.02	The trajectory chart — FY 2024-25 to FY 2028-29	p. 34
07.03	Best-case triggers vs bear-case triggers	p. 35
07.04	Structural reweighting — what survives the forecast	p. 36

This chapter synthesises Chapters 0 through 6 into three forecast scenarios. All projections are scenario-based and contingent on identified policy and demand triggers materialising within stated timeframes.

The recovery is conditional. The structural reweighting is not.

Three scenarios for FY 2028-29: Best US\$ 29.0M (full US tariff rollback + accelerated EU EPR), Central US\$ 26.5M (18% tariff moderating to 10–12%, EU stable, Canada/AU growth), Bear US\$ 21.5M (tariff persists at 18%+, no new destination conversion).

BEST CASE FY 28-29

\$29.0M

13.0% CAGR from trough. Requires full US tariff rollback to pre-IEEPA 8–10% by mid-CY 2026.

CENTRAL FY 28-29

\$26.5M

9.8% CAGR from trough. Tariff moderates to 10–12% by CY 2027; EU grows 6–8% annually.

BEAR FY 28-29

\$21.5M

2.2% CAGR from trough. Tariff persists at 18%+ through CY 2027; no new destination promotion.

ALL-SCENARIO CONSTANT

W. Eur

Permanently > USA. Western European share 45–55% of industry value across all three cases.

WHAT THIS MEANS

The headline forecast number depends on US policy. The structural conclusion — Western Europe permanently exceeding the US as regional destination, and Tier 1 share rising within a smaller-but-recovering industry — holds in all three scenarios. Planning should be built on the structural conclusion, not the headline scenario.

The three-scenario architecture is defined by three policy and demand triggers acting in combination. The first is the trajectory of US tariff policy through FY 2026-27 and FY 2027-28 — whether the 7 February 2026 reduction to 18% holds, moderates further, or is reversed. The second is the pace of EU SUP-Directive enforcement intensification and the introduction of EPR variant fees in additional member states.

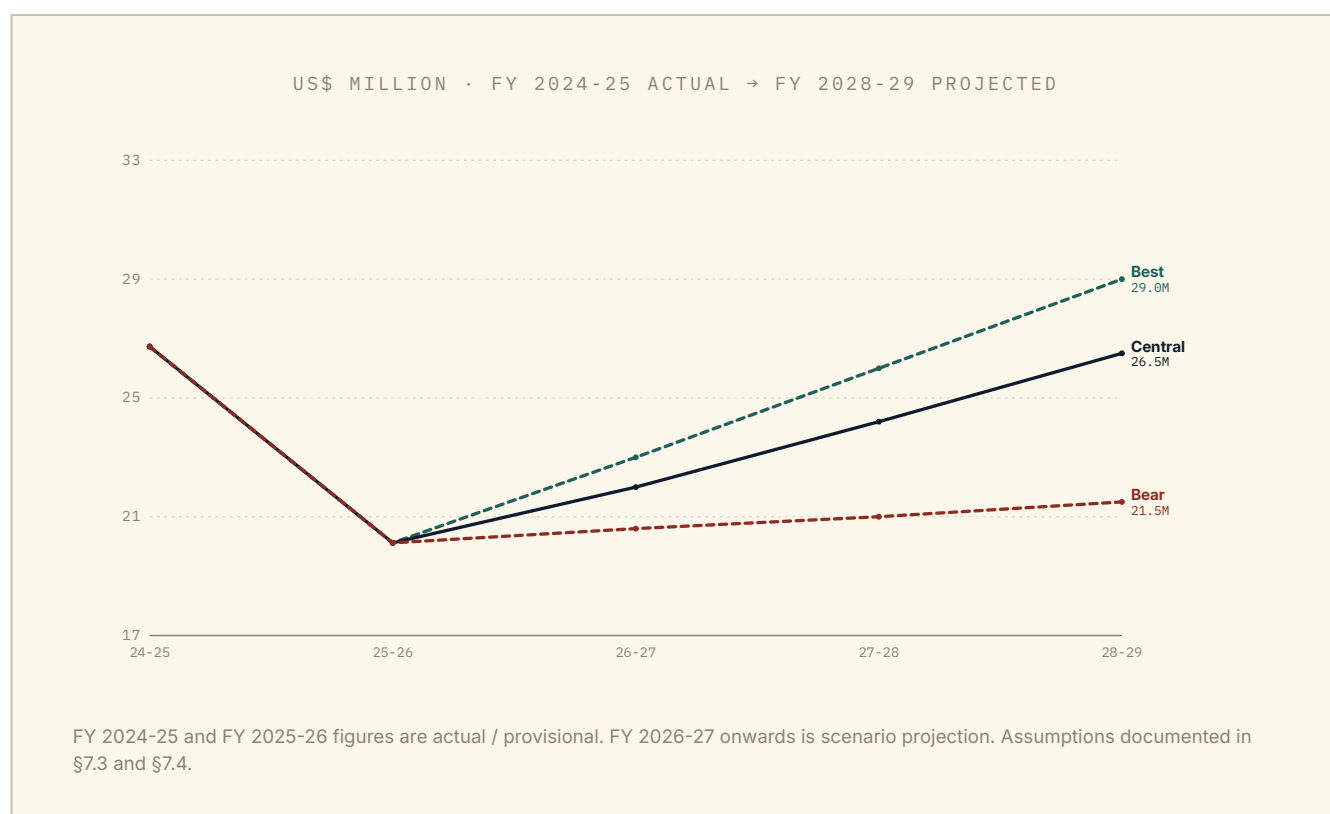
The third is the rate at which new destination markets — Canada, Australia tier expansion, Middle East premium hospitality, Southeast Asia institutional — convert from long-tail to top-20 status. The Central Case assumes all three triggers operate at their median trajectory; the Best Case requires a coincidence of three positive triggers; the Bear Case requires structural deterioration on all three.

FIG. 7.1 • FORECAST SCENARIOS

US\$ M • FY 2024-25 actual → FY 2028-29 projected

Three scenarios. One structural reweighting.

Best case requires full US tariff rollback and accelerated EU EPR convergence. Central case assumes the 18% rate moderates to 10–12% by CY 2027. Bear case caps the US flow at the FY 2025-26 floor. All three reweight permanently toward Western Europe.



01

All three scenarios recover from FY 2025-26.

Even the bear case projects modest positive CAGR from the FY 2025-26 trough. The downside scenario is slow recovery, not continued decline.

02

Central case recovers to the FY 2024-25 level by FY 2028-29.

Three-year recovery to the FY 2024-25 level under median policy assumptions. The headline industry size returns, but the composition is permanently different.

03

The destination mix permanently shifts.

Western Europe at 45–55% of industry value in all three cases. Tier 1 manufacturer share rises in all three. The Chapter 4 reweighting is the structural baseline.

Best-case triggers vs bear-case triggers — what would have to be true.

BEST CASE TRIGGERS

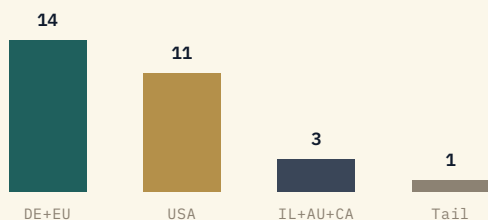
US\$ 29.0M

FULL RECOVERY · ACCELERATED EU PULL · NEW DESTINATIONS

13.0%

- **US tariff rollback to pre-IEEPA.** Effective rate moderating to 8–10% by mid-CY 2026; restoring 85–90% of FY 2024-25 US import volume by FY 2028-29.
- **Accelerated EU EPR convergence.** Harmonised producer fees effectively doubling the cost of plastic packaging across the bloc; pulling forward substrate substitution.
- **Top-20 destination promotion.** Saudi Arabia hospitality, Singapore institutional, South Africa retail — 2–3 long-tail conversions contributing US\$ 1.5–2.0M incremental annual value by FY 2028-29.
- **Tier 1 utilisation rise.** From ≈ 35% (FY 2024-25) toward 55–60% across the cluster, supporting price stability and margin expansion.

BEST CASE · FY 28-29 MIX (US\$ M)



BEAR CASE TRIGGERS

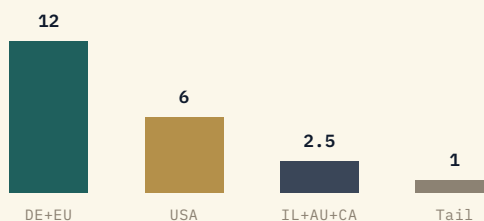
US\$ 21.5M

TARIFF PERSISTENCE · PLATEAU · COMPETITIVE PRESSURE

2.2%

- **US tariff persistence at 18%+ through CY 2027.** Structurally repricing US imports out of competitive viability; capping US-bound exports at the FY 2025-26 floor through the forecast window.
- **EU enforcement plateau.** Existing SUP Directive instruments operating but no further widening; EPR fee convergence stalls.
- **No top-20 destination conversion.** Long-tail promotion stalls; Saudi / Singapore / SA candidacies do not materialise within horizon.
- **Tier 2/3 competitive pressure.** Sri Lanka, China, Vietnam compress Tier 2 margins; accelerated Indian consolidation suppresses aggregate output near-term.

BEAR CASE · FY 28-29 MIX (US\$ M)



What does not change across the three scenarios.

Common structural conclusions

W. EUROPE ≥ 45% OF VALUE

TIER 1 SHARE RISES

CULTIVATION MOAT INTACT

Three conclusions are constant across all three scenarios: Western Europe holds at least 45% of industry value through FY 2028-29; Tier 1 manufacturer share of total output rises; and India's 62% cultivation / 98% export share is not threatened by any alternative origin within the forecast horizon.

What survives the forecast — the four structural facts.

W. EUROPE PERMANENTLY > USA

+45% of value

Across all three scenarios, FY 2028-29. Best: W.Eur ≈ 48% / USA ≈ 38%. Central: ≈ 52% / 30%. Bear: ≈ 56% / 28%. The crossover is permanent.

CULTIVATION MOAT INTACT

62% / 98% cult / export

No alternative origin replicates within the horizon. The 7-year palm maturity + 2-year capacity build means no origin can reach Tier 1 capacity within the forecast window.

TIER 1 SHARE RISES

40 → 55% of output

Tier 2/3 consolidation accelerates. Driven by certification-led procurement preference and the 10-day loading-discipline differential.

RECOVERY CONDITIONAL ON US

Tariff swing

US tariff trajectory is the single largest forecast swing variable. EU demand pull, India supply base, certification framework and logistics architecture are all forecast-stable.

IMPLICATIONS FOR THE FORECAST

Plan for the structural baseline. Position for the upside.

The structural conclusions hold in all three scenarios and should be the basis of any Tier 1 commercial plan: the destination map is permanently reweighted; Tier 1 share is rising; certification investment is the cost of competing; the cultivation moat protects against origin substitution. Position separately for the US tariff swing — the single largest source of upside between the bear case (US\$ 21.5M) and the best case (US\$ 29.0M) — but it does not determine the shape of the industry.

CHAPTER SOURCES

Chapter 0 — triangulation (FAOSTAT, UN Comtrade) · Chapter 1 — cultivation (GoI Horticultural Statistics, FAOSTAT) · Chapter 2 — capacity (practitioner interviews, Tier 1 disclosures) · Chapter 3 — trade flows (TradeStat, Volza, RBI) · Chapter 4 — destinations (TradeStat, UN Comtrade, US CBP, FDA) · Chapter 5 — logistics (Volza, Drewry, port authorities) · Chapter 6 — regulation (European Commission, UK HMRC, FDA, FSANZ, GoI MoEFCC).

Methodology & Sources

A.1 Primary trade-data authority. Indian export trade data uses the Department of Commerce, Government of India, TradeStat / DGCI&S export tables under the combined codes HS 46021919 (palm leaf items, other than baskets — the principal palm-leaf-plate code) and HS 46021990 (the residual sub-heading carrying the remainder of palm-leaf-plate shipments). These are the only two sub-codes under HS 4602 that carry palm leaf plates; presenting either alone produces a structural undercount of roughly half. The earlier HS 46029090 line returned nil on the June 2026 live pull and has been superseded by HS 46021990. Fiscal years are Indian (April–March); FY 2025-26 is provisional pending DGCI&S year-end consolidation.

A.2 Cultivation and agricultural data. FAOSTAT provides the cross-country areca cultivation comparison used to derive India's 62.4% global share of areca cultivation area. Within-India state-level data uses Horticultural Statistics at a Glance 2022-23 (Department of Agriculture & Farmers Welfare) and the Indiastat database for time-series.

A.3 Commercial trade-data triangulation. Triangulation uses Volza Grow shipment-level export records and UN Comtrade reciprocal mirror-trade data. Volza provides shipment-level granularity (consignee, shipper, container detail); UN Comtrade validates aggregate destination-side import figures against TradeStat, with agreement generally within 5–8% at the country level.

A.4 Conversion basis. Plate-count and container-equivalent estimates are derived from TradeStat value- and volume-level export data using internal conversion assumptions calibrated to an export-weighted mix of plate and bowl sizes. The specific per-unit and per-container factors are held as internal methodology and are not published on report surfaces; only total revenue and total plate-volume estimates appear in the report. Kilogram-level figures are excluded from all report surfaces as a standing editorial rule.

A.5 Tier classification. The five-tier manufacturer classification (Chapter 2) is constructed from practitioner interviews and Tier 1 disclosures. Tier 1 (export-grade integrated, multi-certification, 4M+ plates/month, direct importer relationships) $\approx$ 5–7 operators across the Karnataka cluster; Tier 2 (export-grade, selective certification, 1–3M plates/month) $\approx$ 15–20; Tier 3/4 (cottage and small-format, primarily domestic) form the long tail. The classification is industry-internal.

A.6 Practitioner attribution. Direct quotations from Vinay Manjeshwar represent industry-practitioner perspective from 15+ years operating in the export palm leaf tableware industry as founder of Ecodyne Tableware (a brand of Conservia Partners). Other practitioner perspectives are publicly attributable or described in aggregate where individual attribution would compromise commercial confidentiality.

A.7 Limitations and outstanding inquiries. Three principal limitations apply. First, FY 2025-26 figures are provisional and will be revised on DGCI&S year-end publication; material revisions are possible but not expected to alter the qualitative conclusions. Second, the report relies on the combined HS 46021919 + HS 46021990 framework; a small residual mis-classification cannot be ruled out without granular customs-record audit. Third, an RTI request filed with CBIC for HSN-wise domestic outward-supply data returned a nil response — the data is not maintained at that aggregation level. This is recorded as a documented methodology finding, not an outstanding inquiry.

A.8 Domestic-market estimation. Domestic market size ($\approx$ US\$ 55.6M) is estimated from unofficial GSTN registered-outward-supply statistics and is presented strictly as a registered-trade floor, not a ceiling. Informal and unregistered domestic production is not captured; the figure is a context line, not a primary measurement.

SOURCE CATALOGUE

TradeStat / DGCI&S, Government of India — primary export trade data • FAOSTAT — areca cultivation area, cross-country • Horticultural Statistics at a Glance 2022-23 — state-level cultivation • Indiatat — state-level time-series • Volza Grow — shipment-level export records • UN Comtrade — destination-side mirror import data • Reserve Bank of India — all-goods export totals • European Commission — Directive (EU) 2019/904 • US FDA — GRAS Notice GRN 1281 (May 2025) • US

Customs and Border Protection — IEEPA tariff guidance 2025-26 • UK HMRC — Plastic Packaging Tax guidance 2025-26 • FSANZ — food-contact regulation • GoI MoEFCC — Plastic Waste Management Rules 2022 • Drewry World Container Index — freight benchmarking • CPCRI (Vittal) — areca agronomic research • CAMPCO — farmer aggregation data • Practitioner interviews and Tier 1 manufacturer disclosures.