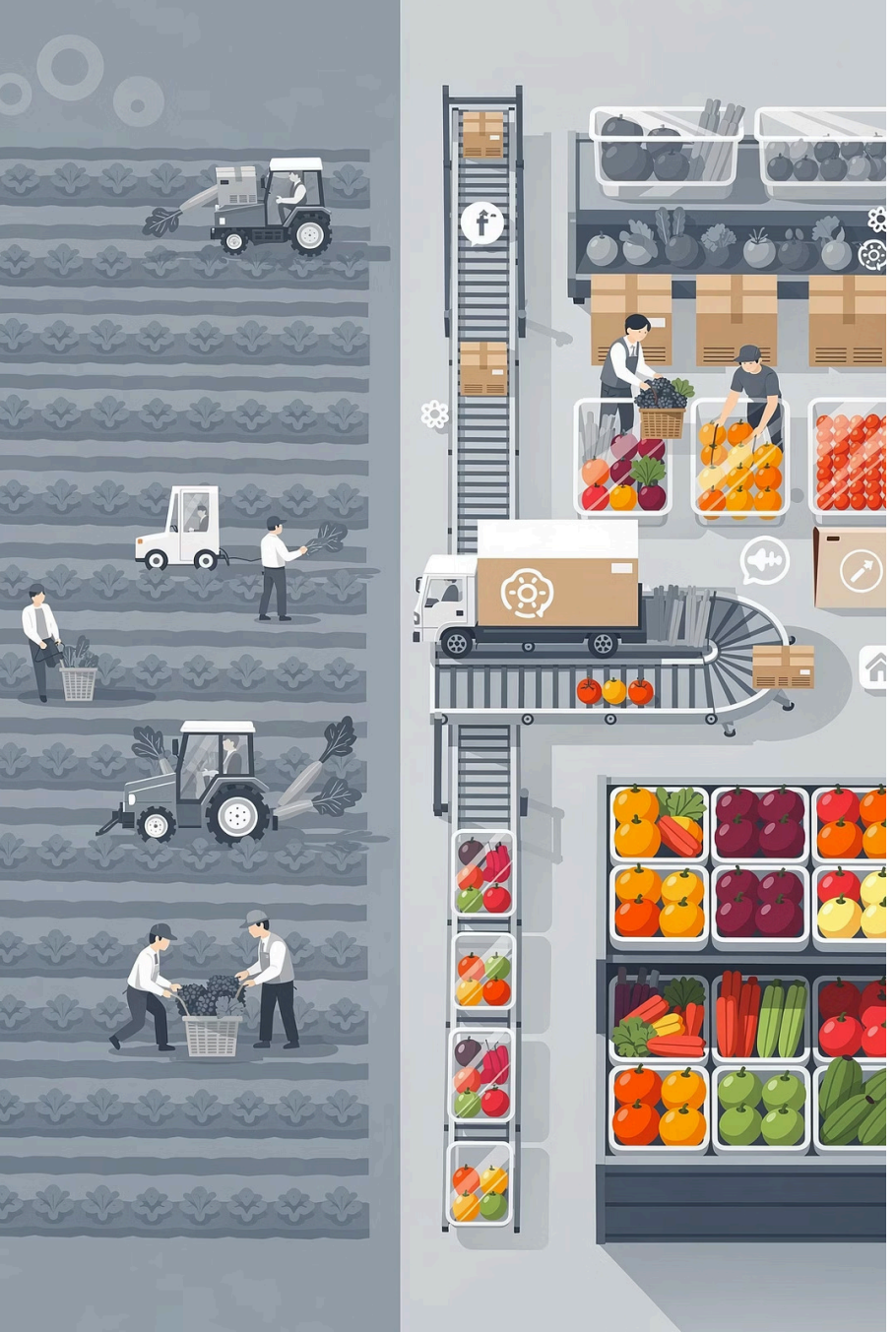

From Soil to Shelf: How Packaging Protects Fresh Produce and Reduces Food Waste

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the Royal NNZ Group bv

Executive Summary

Fresh produce represents one of the most demanding and critical segments in the global food supply chain. Every year, approximately one-third of food produced globally is lost or wasted - a figure representing both profound environmental impact and significant economic loss [1]. For fresh produce specifically, packaging plays a decisive role in this equation. Yet packaging is often viewed simply as a cost line item rather than as a strategic tool for waste reduction, margin protection, and sustainability leadership.

This whitepaper explores how modern packaging solutions directly influence food waste, shelf life, and retailer profitability across key produce categories. Using real-world examples and a structured methodology - **Reinvent, Redesign, Research, and Recycle (Re-Think)** - we demonstrate how optimized packaging choices create value across the entire supply chain: from growers reducing harvest losses, to packers improving throughput and consistency, to retailers maximizing shelf presence and reducing shrink, to consumers enjoying fresher products.

Sustainability is at the heart of everything we do. From reducing packaging materials to pioneering new recycling solutions, we are committed to helping our customers achieve their environmental goals without compromising on freshness or performance. Whether it's potatoes, onions, carrots, or fruits, we offer a broad portfolio of sustainable options tailored to your needs.

For companies seeking to position themselves as advisors in the fresh produce and packaging markets, understanding and acting on these dynamics is essential [2] [3]. This document outlines the mechanisms, the evidence, and the practical framework for delivering packaging solutions that protect margin, reduce waste, and build brand trust.

Let's rethink packaging together

Independent Fresh Produce Packaging Supplier and Advisor

NNZ is your independent fresh-produce packaging advisor with a broad, global portfolio and over a century of experience in fruit and vegetable packaging.

NNZ is free to choose the best producers worldwide to match your needs, and has worked with many of them as trusted partners for decades. This long-term collaboration ensures that customers receive high-quality packaging that protects their fresh produce, runs smoothly on existing packing lines and delivers the right performance at the right cost.

Working from the **#Rethink approach** - Reinvent, Redesign, Research and Recycle - NNZ begins by assessing your current packs, supply chain and sustainability goals, then provides fact-based advice on alternative materials and formats, including their environmental footprint, shelf-life performance, costs and consumer impact.

Through co-creation, pilots and innovation, NNZ helps growers, packers and retailers worldwide make better packaging decisions that reduce waste, improve margins and prepare them for future regulations.

NNZ Packaging Portfolio

NNZ's fresh-produce portfolio is covering, "Retail packaging for produce", all bags (plastic, paper, net, jute), films, cups/shakers, trays in multiple materials, pre-pack items and shoppers, and, "Transport packaging for produce", all jute/net/paper/PP woven bags, ventilated FIBCs, pallet netting and transit-securing solutions.

Market segment	Product types (as described by NNZ)	NNZ.com link
Retail packaging for produce	Bags (plastic, paper, net, jute) for consumer packs; films (plastic, paper) for flowpacks and lidding; cups and shakers; trays (plastic, cardboard, fibre, wooden, aluminium); pre-pack supplies; shoppers.	Global portfolio
Transport packaging for produce	Jute bags; woven and knitted net bags; paper bags; PP woven bags; ventilated FIBCs; pallet netting; other transit/transport-securing packaging for fresh produce.	Global portfolio

The Fresh Produce Challenge: Scale and Stakes

Global Food Waste and Its Distribution

Food waste occurs at every stage of the supply chain. Estimates suggest that in developed markets, approximately **15–20% of fresh produce loss occurs at the retail stage alone**, with additional losses during transport, storage, and consumer use [1] [4]. Root causes include:

- Cosmetic defects from poor handling or sub-optimal packaging
- Spoilage and dehydration due to inadequate environmental control
- Damage during transit from vibration, temperature fluctuations, and compression
- Consumer waste at home due to perceived quality decline or confusion about shelf life

For retailers operating on thin margins - typically 1–3% for fresh produce - even a 2% reduction in shrink translates directly to meaningful profit recovery [2] [4].

Environmental and Economic Drivers

The stakes are reinforced by regulatory and consumer pressure:

Regulatory

The EU Packaging and Packaging Waste Regulation (PPWR) now restricts certain single-use plastic packages for fresh produce under 1.5 kg and mandates increasingly higher recycling thresholds [5]. Similar pressures are emerging across North America, Asia-Pacific, and other regions [5].

For guidance on PPWR compliance and planning, visit: **PPWR guidance** [5]

Consumer Expectation

Research shows that environmental impact is viewed as significantly more important for fresh fruit and vegetables than for many other product categories [3]. Consumers increasingly expect both freshness and sustainability from retailers and brands [3] [6].

Supply Chain Governance

Retailers and institutional buyers now require suppliers to demonstrate sustainability credentials, often via third-party certifications such as EcoVadis [7]. Packaging choices are increasingly evaluated as part of supplier risk and ESG performance [7].

In this context, packaging is no longer a tactical procurement decision - it is a strategic enabler of competitiveness, compliance, and brand positioning.

Understanding the Fresh Produce Journey

Key Stages and Risk Points

Fresh produce follows a complex, multi-modal supply chain:

01

Harvest and field preparation

Picking, initial sorting, and cooling.

02

Packing

Grading, cleaning, treating, and packing into retail or bulk formats.

03

Storage and accumulation

Temporary holding at pack facility, often under controlled temperature and atmosphere.

04

Transport (domestic and international)

Refrigerated or ambient road/sea/air, with multiple handlings and potential for temperature excursions.

05

Distribution centre

Receiving, sorting, and repackaging in some cases.

06

Retail display

Shelf exposure with lighting, air circulation, and customer handling.

07

Consumer storage and use

Home storage conditions vary widely; packaging messaging and residual freshness are critical.

Packaging Roles Across the Supply Chain

At each stage, packaging serves multiple functions:

Stage	Primary Packaging Role
Packing	Containment, sorting efficiency, branding
Storage & transport	Environmental isolation, protection from vibration and compression
Retail display	Visibility, brand messaging, consumer appeal
Consumer use	Information, portion control, extended shelf life (e.g. resealable)

Category-Specific Vulnerabilities

Different produce categories face distinct challenges:

Potatoes & Root Vegetables

Risk: Dehydration, bruising, sprouting (exacerbated by exposure to light)

Key packaging properties: Opacity, ventilation, durability

Example innovation: Perforated light-blocking bags reduce sprouting and material use vs. traditional solid bags [8]

Berries & Delicate Fruits

Risk: Crushing, mold growth, rapid ripening

Key packaging properties: Cushioning, breathability, portion control

Example innovation: Breathable films and resealable punnets extend shelf life while reducing packaging waste [6] [9]

Leafy Greens & Salads

Risk: Wilting, condensation-induced spoilage, ethylene sensitivity

Key packaging properties: Moisture balance, ethylene control, ventilation

Example innovation: Modified Atmosphere Packaging (MAP) and ethylene-absorbing films can extend shelf life by 3–5 days [10]; benefit from recyclable EMAP mono-PE films with laserperforation.

Citrus & other Firm Fruits

Risk: Dehydration, mold, mechanical damage

Key packaging properties: Structural rigidity, water-vapor barrier, ventilation

Example innovation: Hybrid paper-based trays with vented designs combine sustainability and performance [5] [9]

How Packaging Protects and Extends Shelf Life

Core Protective Functions

Environmental Isolation: Packaging acts as a barrier against temperature fluctuations, humidity, light, and pathogens. Insulated or reflective materials help stabilize internal conditions, particularly critical in long-haul transport [10] [11].

Oxygen Control: Oxygen accelerates ripening, oxidation, and microbial growth. Modified Atmosphere Packaging (MAP) - which replaces normal air with a controlled gas mixture (typically nitrogen or CO_2) - can extend produce shelf life by 40–100% depending on the product [10] [11]. Traditional films with optimised oxygen permeability provide passive MAP benefits [10].

Moisture Management: Both excessive moisture (promoting mold) and excessive dryness (causing wilting) harm produce. Packaging must allow appropriate gas exchange while preventing dehydration. Perforated films, breathable paper designs, and moisture-absorbing liners each address specific needs [9] [11].

Light Protection: Certain produce types - particularly potatoes and some leafy greens - are sensitive to light, which triggers sprouting or degradation. Opaque or light-filtering packaging prevents these issues [5] [10].

Mechanical Protection: Cushioning, structural integrity, and controlled stacking prevent bruising and damage. Improved packaging design can reduce physical damage by 15–40% depending on the product and transport distance [2] [11].

Quantified Shelf-Life Gains

Research and field trials demonstrate measurable shelf-life extension when packaging is optimized:

Intervention	Product Category	Shelf-Life Extension	Reference
MAP with controlled CO_2	Pre-cut salads, berries	3–5 days (~40–50%)	[10]
Ethylene-absorbing films	Berries, leafy greens	2–4 days (~30–50%)	[10]
Breathable film (ventilated)	Potatoes, onions	2–4 weeks (~15–20%)	[8] [11]
Improved barrier film	Citrus in long-haul export	1–3 weeks (~10–15%)	[11]
Insulated/reflective wrapper (transit)	Tropical fruit, berries	1–2 weeks (~20–30%)	[11]

These gains translate directly to:

- **Reduced shrink:** Less product marked down or discarded
- **Wider distribution geography:** Products can reach more distant markets
- **Price realization:** Fresher products command higher prices
- **Reduced consumer waste:** Products reach consumers while still in acceptable condition

Balancing Protection with Sustainability

The Core Tension

Modern packaging faces a paradox: delivering optimal protection for fresh produce - which often requires multi-layer, plastic-based films - while reducing environmental impact. Traditional MAP films and cushioning layers have substantial carbon footprints and present end-of-life challenges [5] [9].

Yet moving too aggressively toward lighter or fiber-based alternatives without sufficient barrier or structural properties risks increased food waste, which itself has environmental cost [2] [5]. The solution is not to choose protection or sustainability, but to optimize the trade-off through systematic redesign.

Material Innovation and Mono-Material Design

Fiber-based alternatives

Corrugated trays, solid-board punnets, and paper-based film combinations are expanding the viable option set [5] [9]. These materials offer:

- High recyclability and integration with existing infrastructure
- Lower carbon footprint than virgin plastics
- Consumer perception of sustainability
- Increasingly comparable barrier properties to traditional plastics

Mono-material design

Regulatory and recycling infrastructure pressures are driving toward single-material packages that disassemble easily or are made from a single polymer. Challenges include:

- Maintaining barrier properties without multi-layer constructions
- Meeting cost targets
- Proving real recycling rates (not just theoretical recyclability)

Successful mono-material solutions use:

- Oxygen-barrier or modified-permeability films (e.g., advanced PE or bio-based alternatives)
- Single-polymer laminates or coatings
- Clear labeling to support consumer sorting and recycling compliance

Real-world Gains: NNZ's Potato Packaging Innovations

NNZ demonstrates systematic plastic reduction while maintaining performance across multiple markets:

NNZ Nordic: 30% less plastic with mono-material BOPE bags

In Scandinavia, NNZ Nordic launched an innovative mono-material BOPE (Biaxially Oriented Polyethylene) bag for 1.5 kg and 2.5 kg potatoes. Compared to traditional bags, the new design delivers **30% less plastic, 30% more meters per roll, and significantly lower CO_2 emissions** throughout the entire supply chain, all without compromising on performance, quality, or shelf life [8] [78].

Watch the innovation in action: **Video link** [53]

NNZ Germany: 50% less plastic with Carry-Fresh optimization

The Carry-Fresh potato bag was continuously optimized by reducing the weight of net and label, and finally switching to mono-material for better recyclability. This long-term redesign effort reduced plastic by **up to 50%** in the German potato market, demonstrating how incremental improvements scale into category-level transformation [8] [36].

Revolutionary potato bags: Heat-sealable, breathable, 100% recyclable

NNZ's revolutionary potato bags feature heat-sealable paper pillows and gusseted pouches with cellulose breathable windows. These bags are **100% recyclable**, available as roll stock or pre-formed formats, and compatible with VFFS machines, offering sustainability without operational compromise. Featured with retailers such as Lunds & Byerlys [8] [79].

Jute potatoes: Natural, renewable, fast-growing protection

NNZ supplies jute bags as a sustainable packaging solution for potatoes. Jute ensures optimal air circulation, allowing potatoes to "breathe" and maintaining fresh skin and quality during storage and transport. Jute is a fast-growing plant (maturing in just 4–6 months) that absorbs large amounts of CO_2 during growth, replacing fossil-based materials entirely. Jute bags protect potatoes from damage and premature aging, all without using fossil-based materials, making them a sustainable, natural, and renewable choice [8] [40].

The Re-Think Framework: Reinvent, Redesign, Research, Recycle

To systematically balance protection and sustainability, NNZ employs the **Re-Think methodology**, which structures decision-making around four pillars:

Reinvent

Challenge baseline assumptions. Can a pack reduce material by 10–20% without losing shelf-life benefits? Is the current format optimal for the product and logistics chain? Could a lighter or alternative-material version be substituted?

Redesign

Translate reinvention ideas into practical, manufacturable designs that run on existing or near-standard equipment, achieve specified barrier and strength properties, meet visual and messaging requirements, and integrate smoothly into supply-chain operations.

Research

Validate redesigned solutions through laboratory testing, pilot trials on customer lines, consumer testing, and environmental assessment.

Recycle

Ensure real circularity by mapping actual recycling infrastructure in target markets, designing for materials with established collection and reprocessing, optimizing for material quality and value retention, and supporting customer communication.

Learn more about NNZ's sustainability commitment and Re-Think approach:

NNZ Sustainability Report 2024

Practical Design Guidelines for Retailers

When developing or refreshing packaging, retailers should embed these principles:

Limit material combinations

Minimize incompatible layers; prefer mono-material or easily separable components.

Design for disassembly

Avoid adhesives where possible; use mechanical closures or perforations.

Choose materials with proven recycling streams

Verify collection and reprocessing capacity in target markets, not just theoretical recyclability.

Label clearly

Provide icons and instructions for sorting (e.g. "Remove film, recycle tray separately").

Involve the supply chain early

Pilots with packers, logistics, and retailers prevent costly redesigns post-launch.

Communicate authentically

Explain the protection and sustainability rationale to consumers; avoid greenwashing.

Real-World Case Studies and Impact

Potatoes: Reduced Plastic, Maintained Freshness

Challenge: Traditional potato bags used significant virgin plastic and contributed to light-induced greening and sprouting during retail display.

Approach: NNZ designed a lighter, perforated paper-based bag with integrated ventilation and opacity features. More sustainable pack, while the design maintained ventilation while blocking light [8].

Outcomes:

- **Plastic reduction:** 50% less virgin plastic
- **Shelf-life:** No degradation; sprouting incidents reduced due to light blocking
- **Cost:** Slight increase in material cost, as trade-off for sustainability
- **Recycling:** Fiber-based bag integrates directly into existing paper-recycling streams

Insight: Systematic redesign using Re-Think principles revealed that traditional packaging carried unnecessary material; optimization benefited environment, product, and operational efficiency.

Berries and Soft Fruits: Consumer research

Challenge: Consumers also sought more sustainable options. A balancing act!

Consumer Research Insights: NNZ conducted large-scale research in Germany (more than 300 interviews and 11,700 purchasing simulations) on strawberry and blueberry packaging. Key findings revealed a critical gap between consumer claims and actual behaviour:

- **Stated preference:** 61% of respondents claimed they would prefer not to buy products with excessive packaging for ecological reasons.
- **Actual purchasing behaviour:** When shown pricing and packaging information, plastic PET packaging scored higher due to lower price and transparency - consumers value the ability to visually inspect product quality [47] [91].

This research underscores that successful packaging must balance sustainability perception with practical consumer needs (visibility, price, quality assurance). Learn more: **Consumer research findings** [47]

Berries Case Study: Outcomes and Insights

Approach: Collaboration between packer and NNZ resulted in a PET tray with breathable film lid (rather than solid plastic lid) combined with an ethylene-absorbing insert. The design maintains structural integrity while allowing passive gas exchange and ethylene control [10].

Outcomes:

- **Shelf-life:** 2–4 days longer (40–50% extension) compared to traditional punnets
- **Waste reduction:** Fewer marked-down or discarded berries at retail
- **Consumer satisfaction:** Fresher product; clearer visibility of freshness
- **Recyclability:** Single-material (PET) punnet and lidding film for sorting
- **Materials reduction:** Using a top-seal film instead of a lid

Insight: Combining material innovation (breathable film) with functional design (ethylene absorber) achieved both extension and sustainability gains, validating the Re-Think approach.

Leafy Greens: Modified Atmosphere and Resealable Packs

Challenge: Pre-cut salads and bagged greens face rapid wilting and moisture-induced spoilage. Consumers discard waste frequently, and retailers experience high shrink.

Approach: Implementation of Modified Atmosphere Packaging (MAP) with optimized nitrogen/CO_2 ratios, combined with resealable closures to allow consumer resealing and extended home-use shelf life [10].

Outcomes:

Retail shelf-life

7–10 days (vs. 3–4 days for traditional bags)

Consumer use

Resealable design extends usable shelf-life by 2–3 days; reduces consumer-end waste

Volume

Extended shelf-life supports wider geographic distribution and inventory turnover

Sustainability trade-off

MAP films are thicker and multi-layer; offset through reduced overall waste and improved recyclability of film materials used

Insight: For certain categories, temporary acceptance of more complex packaging (MAP, multi-layer) is justified if food waste reduction and shelf-life gains are substantial. Clear end-of-life design and material choice remain essential.

The preferred NNZ alternative: Introduced into the market: mono-material PE film with customized laser-perforation for shelf-life optimization through EMAP (extended modified atmosphere) established in the film bag after packing.

Apple Packaging: Design and Consumer Preference

Apple Packaging Research: NNZ conducted consumer research on apple tray packaging formats across European markets, testing how design influences purchase intent. Results showed that thoughtfully designed trays improved consumer perception and purchase behavior, underscoring that packaging design affects more than protection - it shapes preference and perceived value [46].

Read the full findings: **Consumer preferences apple packaging** [46]

Packaging as a Financial Lever for Buyers

Cost-in-Use Framework

Retail and distribution buyers often optimize packaging based solely on unit cost. This approach misses significant margin leakage from packaging-induced waste. A more robust framework is **Cost-in-Use**, which includes:

$$\text{Cost-in-Use} = \frac{\text{Unit Price} + \text{Waste Loss} + \text{Logistics Inefficiency} + \text{Shrink}}{\text{Volume Delivered Undamaged}}$$

Example: A premium berry punnet with integrated ethylene absorber costs 15% more per unit than a basic punnet. However:

- Shelf-life extension reduces retail shrink by 5–8%
- Lower damage during transport reduces markdowns by 2–3%
- Extended sell window supports higher sell-through at full price

Net effect: Cost-in-Use can be 8–12% lower despite higher unit price.

Margin Impact: Berries Scenario

Example scenario: Berries (standard PET punnet with lid → breathable film + ethylene absorber)

Metric	Baseline	Enhanced	Gain
Unit pack cost	€0.12	€0.15	-€0.03
Shelf-life (retail)	4 days	7 days	+3 days
Shrink %	12%	6%	-6 pp
Sell-through at full price	75%	88%	+13 pp
Blended margin per unit	€0.25	€0.36	€0.11 (44% higher)
Margin impact (500k units/week)	-	+€55k/week	€2.9M/year

These scenarios illustrate why packaging investment, evaluated holistically, is a core profit driver rather than a cost to minimize.

Integrating Packaging into Supply-Chain Strategy

Multi-Stakeholder Alignment

Packaging decisions affect growers, packers, logistics, retailers, and consumers differently. Optimal solutions require transparency and co-creation across these groups:

Growers prioritize

- Damage reduction to maximize acceptable-grade yield
- Shelf-life extension to access distant markets
- Cost predictability and volume flexibility

Packers prioritize

- Line compatibility and speed
- Labeling and branding flexibility
- Supplier reliability

Logistics & Retailers prioritize

- Standardized dimensions for automation
- Environmental control (refrigeration efficiency)
- Shelf presence and turn-rate support
- Sustainability credentials and recycling viability

Consumers prioritize

- Visual assessment of freshness and quality
- Convenience (resealable, portion size)
- Confidence in sustainability
- Price and value perception

Siloed optimization - each party choosing in isolation - results in compromises. Collaborative design that balances these interests yields superior total-chain outcomes.

Role of Innovation and Co-Creation

Leading packaging advisors work with customers through structured innovation cycles:

Discovery

Map current pack performance, pain points, waste sources, and sustainability ambitions.

Ideation

Brainstorm Re-Think concepts (Reinvent, Redesign, Research, Recycle pillars).

Prototype

Develop candidate designs and validate manufacturability.

Pilot

Test on customer production lines; assess shelf life, consumer appeal, and recycling integration.

Scale

Implement across the portfolio with ongoing monitoring and adjustment.

This approach reduces implementation risk and accelerates adoption of innovations that might otherwise remain untested.

Watch how NNZ approaches packaging innovation:

NNZ RESHAPING PACKAGING - This video shows NNZ team members across Scandinavia explaining how they constantly scan supermarkets for new packaging concepts, share samples internally, and co-create solutions with customers in a culture of practical innovation and responsibility [70].

Sustainability and Brand Leadership

EcoVadis and Third-Party Verification

Companies seeking to position themselves as sustainability leaders in packaging increasingly pursue independent certifications such as **EcoVadis Gold** [7]. EcoVadis evaluates suppliers across four key dimensions:

Environment

Carbon footprint, waste, water, materials, recycling

Labour & Human Rights

Working conditions, fair wages, child labour prevention

Ethics

Governance, anti-corruption, fair competition

Sustainable Procurement

Supply chain oversight and supplier accountability

Relevance of EcoVadis for Packaging Suppliers

Relevance for packaging suppliers:

- Gold-tier recognition signals credible sustainability commitment
- Reduces procurement risk for retail and corporate customers evaluating supplier portfolios
- Supports customer reporting on Scope 3 (supply chain) emissions
- Differentiates in competitive tenders and sustainability-focused buyer segments

Achieving and maintaining Gold status requires demonstrated progress on environmental KPIs, transparency in reporting, and continuous improvement - not badge-seeking alone.

NNZ's Sustainability Report 2024 provides transparent disclosure of environmental progress and strategic commitments: NNZ Sustainability Report 2024

Circular Economy and Real Recycling

True sustainability requires **"real recycling"** - not just theoretical recyclability. Key principles:

Material choice

Select materials with established, high-volume, economically viable recycling infrastructure in target markets.

Design for disassembly

Mono-material or easily separable components maximize recovery rates.

Volume and consistency

Sufficient volumes and consistent material quality ensure recycling viability.

Transparent labeling

Clear disposal instructions support consumer compliance and sorting accuracy.

Loop closure

Partner with recyclers and reprocessors; track material destinations and reuse rates.

Examples of Effective Circular Integration

Examples of effective circular integration:

Fiber-based solutions

Cardboard integrate into established paper-recycling streams in most developed markets [5] [9].

rPET closed loops

rPET (recycled polyethylene terephthalate) for trays use establish closed loops with commercial reprocessing partners.

Supporting Recycling Awareness and Design

NNZ regularly hosts webinars and educational content to help customers navigate recycling complexity and support design-for-recycling practices.

Webinars e.g., on plastic packaging recycling: **NNZ Webinar: Recycling of plastic packaging** [11] [18]

NNZ's Role as a Global Packaging Advisor: Network and Examples

Global Reach with Local Expertise

NNZ operates through **22 subsidiaries in 18 countries**, combining global reach with deep local knowledge of produce supply chains and packaging regulations. This network positions NNZ as a partner that can navigate regional differences in retail formats, logistics infrastructure, recycling systems, and consumer preferences [1] [71].

Key NNZ resources:

- Company profile: **LinkedIn** [1]
- Sustainability commitment: **NNZ Sustainability** [63]
- Product portfolio overview: **NNZ UK Products** [71]
- Innovation agenda: **NNZ Innovation** [11]

Recent Innovations and Partnerships

Smart Packaging Industries Collaboration

NNZ entered a global collaboration with Smart Packaging Industries AS to deliver advanced packaging systems for fresh produce. The partnership includes the **Q-Bic® modular tray system**, available in fibre, paperboard, rPET, or PET formats, which can carry up to 30% more product per pallet and is designed for simplified automated handling and better sustainability profiles [12] [33] [69].

Partnership announcement: **Press release** [33]

USDA Sustainable Packaging Innovation Lab partnership: **Perishable News article** [69]

Retail and Brand Solutions

Perfect packaging line for Bustan brand

In close partnership with machinery supplier AB Combi, NNZ developed the "perfect packaging line" for the Bustan brand, integrating packaging design with high-performance automation, branding requirements, and operational efficiency. This project demonstrates NNZ's ability to create end-to-end solutions rather than standalone packs.

Learn more: **Perfect packaging line case study** [59]

The Green Revolution in the Supermarket

NNZ's story showcases how retailers can gradually transition to more sustainable packaging, using concrete examples of switching formats while safeguarding product presentation and operations.

Read the full case: **The Green Revolution in the Supermarket** [63]

Environmental Impact Assessment Tools

Footprint service

NNZ's environmental footprint calculation service offers customers a quantified, science-based approach to comparing packaging options. Using established lifecycle assessment (LCA) methods aligned with European standards, the service helps buyers make fact-based decisions on material selection and environmental trade-offs.

Explore: **Environmental footprint calculation** [63] [67]

Practical Decision Framework for Fresh Produce Packaging

Key Questions to Guide Packaging Selection

When evaluating or redesigning fresh produce packaging, ask:

Product & Shelf-Life

- What is the target shelf-life at retail? (E.g., 5 days, 2 weeks)
- What are the primary deterioration mechanisms? (Dehydration, ripening, mold, oxidation, light-sensitivity)
- Which barrier properties are essential? (Oxygen, moisture, light, ethylene control)

Supply Chain & Operations

- What is the typical transport distance and duration?
- Are storage conditions controlled or ambient?
- What packing line speeds and formats are currently used?
- Where will the product be displayed (ambient, refrigerated, high-traffic)?

Sustainability & Compliance

- What are regulatory requirements in target markets? (E.g., PPWR, extended producer responsibility)
- What are customer sustainability expectations or mandates?
- What recycling infrastructure exists for candidate materials?
- What is the target carbon footprint or recycled-content percentage?

Economics & Performance

- What shrink/loss rates are currently observed?
- What is the realistic shelf-life extension potential and associated margin impact?
- What packaging cost increase can be justified by waste reduction?
- Are there logistics or labour efficiency gains? (E.g., lighter weight, faster palletizing)

Recommendations and Next Steps

For Retailers and Brand Owners

01

Audit current packaging

Map SKUs, material types, waste sources, and shelf-life performance. Identify top opportunities for Re-Think projects.

02

Set sustainability targets

Establish KPIs for material reduction, recyclability, recycled content, and carbon footprint. Include cost-in-use metrics.

03

Engage supply-chain partners

Collaborate with growers, packers, and logistics to align on packaging specs and performance metrics.

04

Pilot innovations

Test 2–3 promising concepts on a subset of SKUs; measure shelf-life, shrink, consumer response, and recycling integration before portfolio-wide rollout.

05

Communicate transparently

Educate consumers on packaging benefits (freshness, waste reduction, sustainability) via on-pack messaging and digital channels.

Recommendations for Packaging Suppliers and Advisors

Invest in research

Build capability in MAP, breathable films, fiber-based alternatives, and circular design. Stay current on regulatory developments.

Offer co-creation services

Develop frameworks and tools to guide customers through Re-Think (Reinvent, Redesign, Research, Recycle) projects.

Demonstrate real impact

Quantify shelf-life gains, waste reduction, cost savings, and environmental benefits using customer data and case studies.

Pursue sustainability credentials

Achieve and maintain certifications such as EcoVadis Gold; communicate achievements transparently.

Build ecosystem partnerships

Collaborate with recyclers, innovation partners, and industry bodies to accelerate circular solutions and scale impact.

Recommendations for Growers and Direct Producers

- **Work with packers and retailers on specs**

  Share performance data (damage rates, shelf-life observations, consumer feedback) to inform packaging decisions.

- **Explore innovative formats**

  Test breathable films, MAP, and fiber-based options that extend shelf-life and reduce shrink; communicate benefits to buyers.

- **Monitor and communicate sustainability**

  Track packaging impact across your supply chain; report progress to retailers and consumers.

Conclusion: Let's Rethink Packaging Together

Fresh produce packaging is not a commodity; it is a **strategic lever for waste reduction, margin protection, and sustainability leadership**. The evidence is clear: optimized packaging - designed through systematic Re-Think methodology and validated through collaboration - delivers measurable gains in shelf-life, waste reduction, and consumer satisfaction while advancing environmental goals.

The market is moving decisively toward solutions that combine protection and sustainability. Regulatory pressures, consumer expectations, and supply-chain accountability mechanisms ensure this trend will accelerate. Companies that position themselves as trusted advisors - understanding both the mechanics of product protection and the economics of total supply-chain value - will build lasting competitive advantage.

Sustainability is at the heart of everything we do. From reducing packaging materials to pioneering new recycling solutions, we are committed to helping our customers achieve their environmental goals without compromising on freshness or performance. Whether it's potatoes, onions, carrots, or fruits, we offer a broad portfolio of sustainable options tailored to your needs.

Let's rethink packaging together and make every pack count for a greener future!

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