Food Waste: Global Best Practices for Grocery Retailers

Colin Peacock

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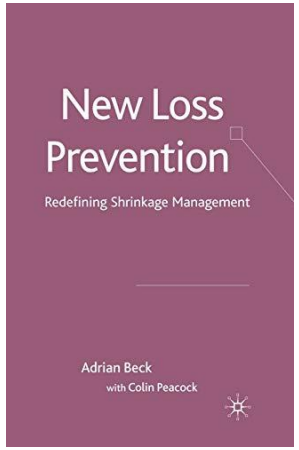
About Colin Peacock

UNIVERSITY OF LEICESTER



P&G

ECR Retail Loss

About ECR Retail Loss

Retailers and CPG's +	Academics +	Grant Providers
		

ECR RETAIL LOSS 2024 HIGHLIGHTS

All our reports and updates are free to access via our website www.ecrloss.com

400
participating retailers

52
weekly email updates

62%
of global top 50 retailers

Source: Kantar, 2024

20
Expert-led podcasts

70+
online meetings

5 X Innovation Summits

1 **FOOD WASTE**
Zaandam, NL

2 **INVENTORY ACCURACY**
London, UK

3 **SELF-CHECKOUT**
Brussels, BE

4 **RFID IN RETAIL**
Barcelona, ES

5 **VIDEO IN RETAIL**
Daventry, UK

3 X Ground-breaking reports

REHUMANISING SELF-CHECKOUT
5 winning student design ideas to cut losses at SCO

VIDEO ANALYTICS IN RETAIL
Discover how other retailers use video

FORTRESS STORES BENCHMARKING TOOL

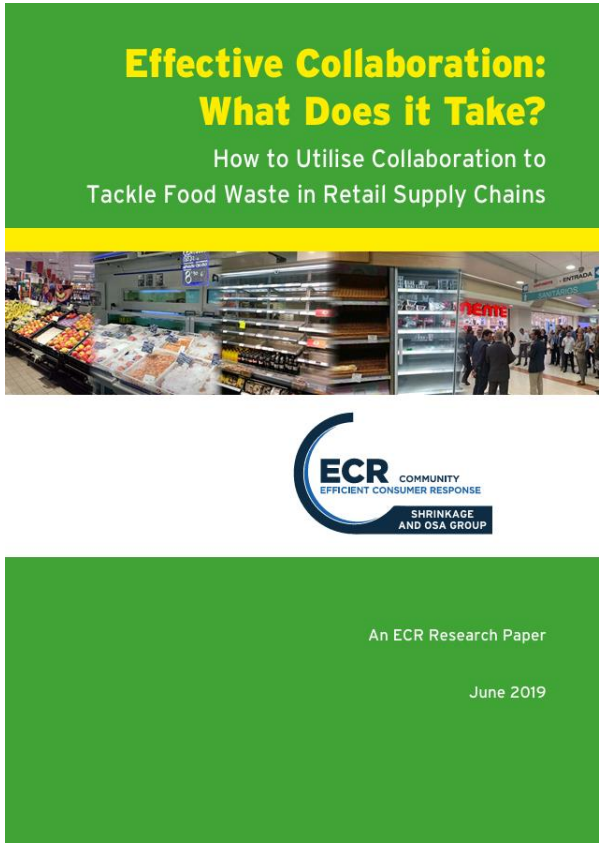
Pool crimebusting ideas from the shopfloor to the boardroom

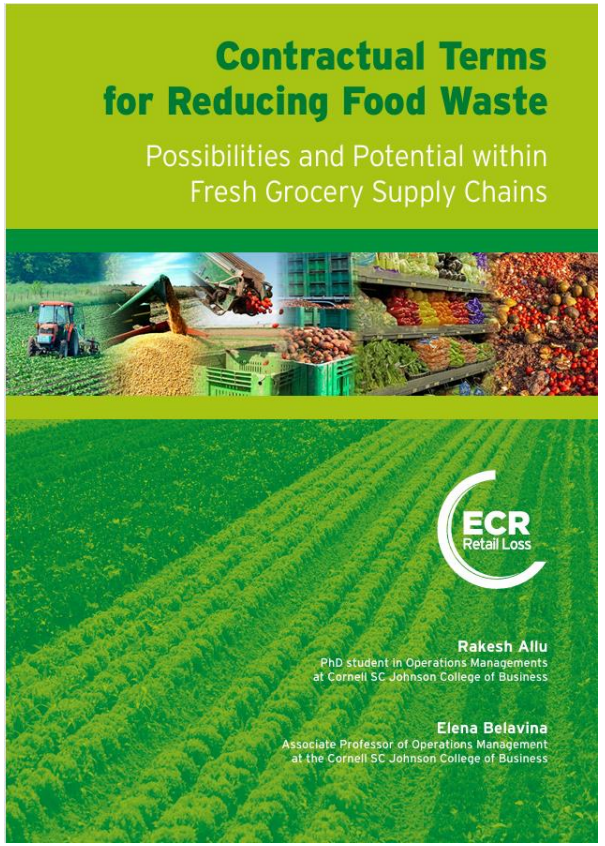
Working Group Objectives & Scope

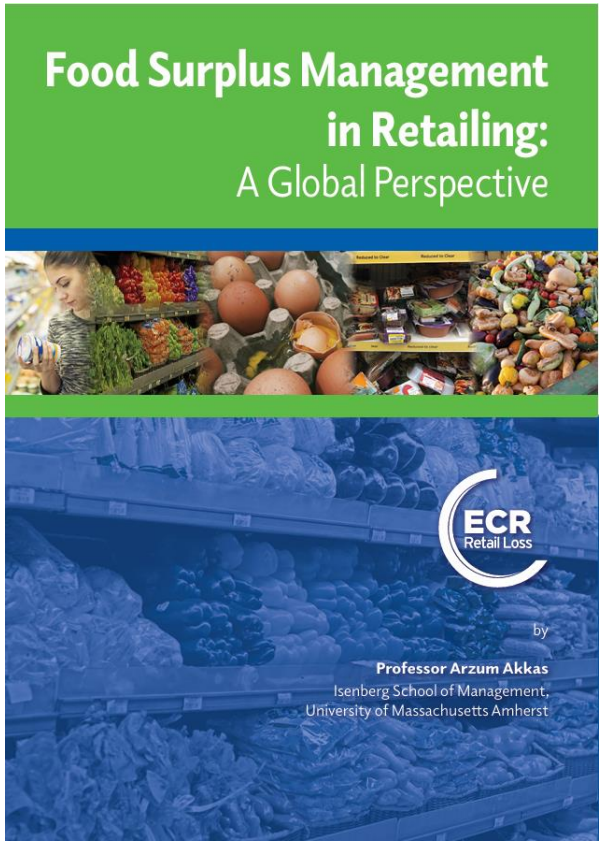
Formed in 2014, the group is focused on the prevention of surplus and the optimisation of work processes associated with the exit of surplus food, specifically.

- *Learnings on new technologies, innovations, especially packaging, to prevent and better manage surplus food in retail stores.*
- *The implementation of new practices and technology to increase visibility to the expiry date. e.g: 2d, ledgers, etc*
- *Organisational strategies and case studies on delivering food waste reduction, especially the role of collaboration*
- *Understanding the true cost of food waste and best practices to manage the exit of surplus food, including markdowns*
- *Category deep dives, best practices for the high waste categories including in-store production bakery, bananas, etc*

GTIN	(01)
BATCH/LOT	(10)
EXPIRY	(17)
NET_WEIGHT	(3102)
PRODUCT_URL	(8200)







Research Published (To Date)

2025 Dates

Jan 21st – Prompted Markdowns

Jan 29th – Top Three Priorities

Feb 11th – Store Colleague Donations

April 9th – QR / 2D Codes Retailer Updates

April 22nd – Where to Display Markdowns?

May 13th – Banana Special

June 11th – Innovations in Markdowns

July 8th – Bakery Special

Sept 11th – Winning Hearts & Minds

Oct 15th – 10X20X30 Collaboration Updates

Nov 12th & 13th – Food Waste Innovation Summit

Nov 12/13 – Food Waste Innovation Summit - Dublin

- Store Visits
- Academic Research
- Innovation Showcase
- QR Code Updates
- Hot Topic Debates / Discussions
- Research – What Next?

Ten Years – Ten Key Learnings!

1. Language Matters – Surplus, Unsold or Waste?
2. Conflicting Goals – Corporate Vs Business
3. Drivers of Store Based Surplus / Waste are Company Wide
4. Each Category is Uniquely Different
5. [Can Be] Conflicting Internal Priorities
6. The Fresh Case Cover Formula
7. OSA Service Level Differentiation as a Lever
8. Significant Hidden Costs of Managing Unsold Food
9. Increased Energy to Finding New Ways to Manage Markdowns
10. Hoorah! We are getting closer to 2d

Definition of Food Waste varies across Retailers

Source: ECR Report – Prof Arzum Akkas - 2024

1) Food Surplus, Unsold Food or Food Waste?

1

Food Surplus – is when the supply of food exceeds demand…

2

Unsold Food – is the food not sold before their products date codes have expired

3

Food Waste – is when food is ultimately not consumed by humans

2. Conflicting Corporate Vs Business Goals

Push to REMOVE Plastic

PROJECT DRAWDOWN

DONATE

* Gigatons CO2 Equivalent Reduced / Sequestered (2020–2050)

SOLUTION	SECTOR(S)	SCENARIO 1 *	SCENARIO 2 *
Reduced Food Waste	Food, Agriculture, and Land Use / Land Sinks	88.50	102.20
Plant-Rich Diets	Food, Agriculture, and Land Use / Land Sinks	78.33	103.11
Family Planning and Education	Health and Education	68.90	68.90
Refrigerant Management	Industry / Buildings	57.15	57.15
Tropical Forest Restoration	Land Sinks	54.45	85.14
Onshore Wind Turbines	Electricity	46.95	143.56
Alternative Refrigerants	Industry / Buildings	42.73	48.75
Utility-Scale Solar Photovoltaics	Electricity	40.83	111.59
Clean Cooking	Buildings	31.38	76.34
Distributed Solar Photovoltaics	Electricity	26.65	64.86
Silvopasture	Land Sinks	26.58	42.31
Methane Leak Management	Other Energy	25.83	31.29
Peatland Protection and Rewetting	Food, Agriculture, and Land Use / Land Sinks	25.40	40.27
Tree Plantations (on Degraded Land)	Land Sinks	22.04	35.09
Temperate Forest Restoration	Land Sinks	19.42	27.85
Concentrated Solar Power	Electricity	18.00	21.51
Perennial Staple Crops	Land Sinks	16.34	32.87
Insulation	Electricity / Buildings	15.38	18.54
Regenerative Annual Cropping	Food, Agriculture, and Land Use / Land Sinks	15.12	23.21
Tree Intercropping	Land Sinks	15.03	24.40
LED Lighting	Electricity	14.45	15.69
Managed Grazing	Land Sinks	13.72	20.92
Multistrata Agroforestry	Land Sinks	13.26	23.94
Conservation Agriculture	Food, Agriculture, and Land Use / Land Sinks	12.81	8.08
Abandoned Farmland Restoration	Land Sinks	12.48	20.32
Recycling	Industry	10.36	11.29
Offshore Wind Turbines	Electricity	10.22	9.89
Improved Rice Production	Food, Agriculture, and Land Use / Land Sinks	9.85	14.43
Building Automation Systems	Electricity / Buildings	9.55	14.01
Public Transit	Transportation	9.42	15.42

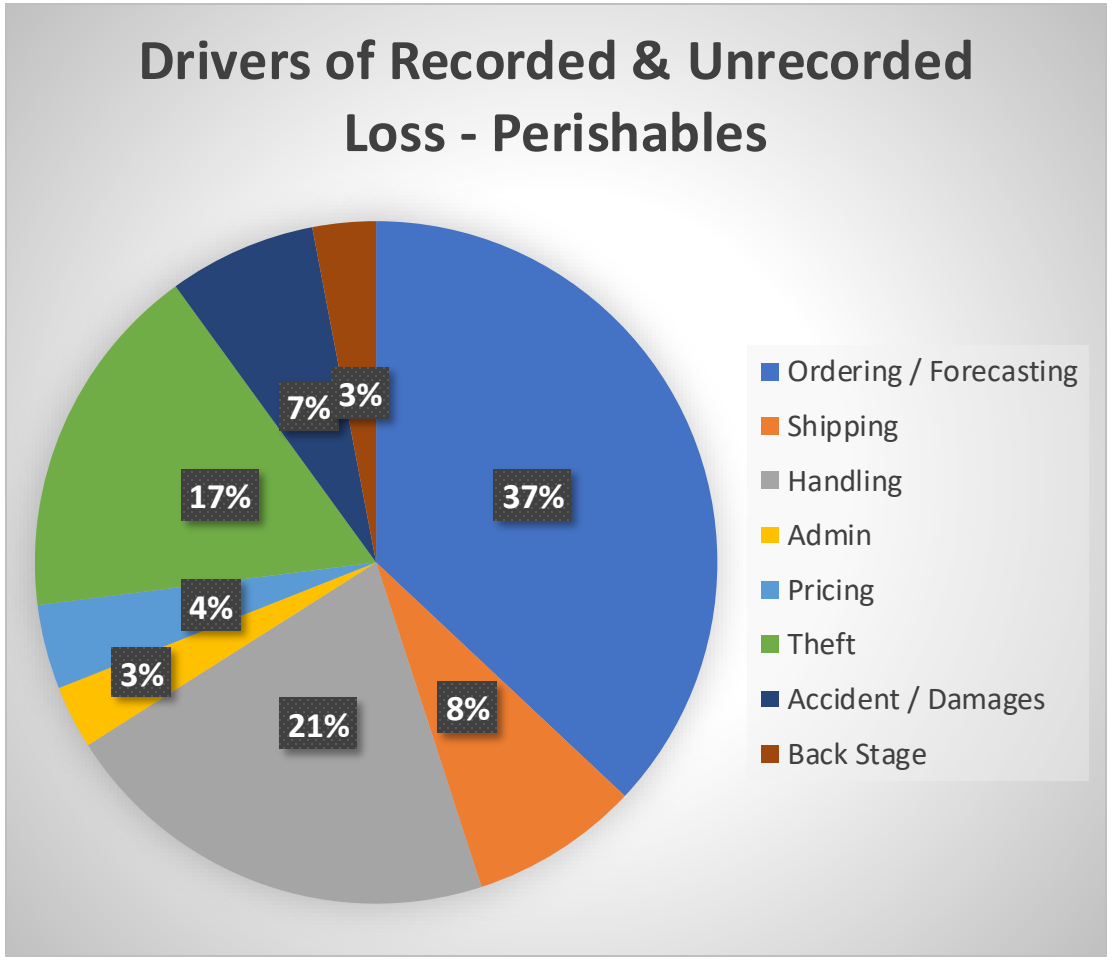
3) Drivers of Store Waste are Company Wide

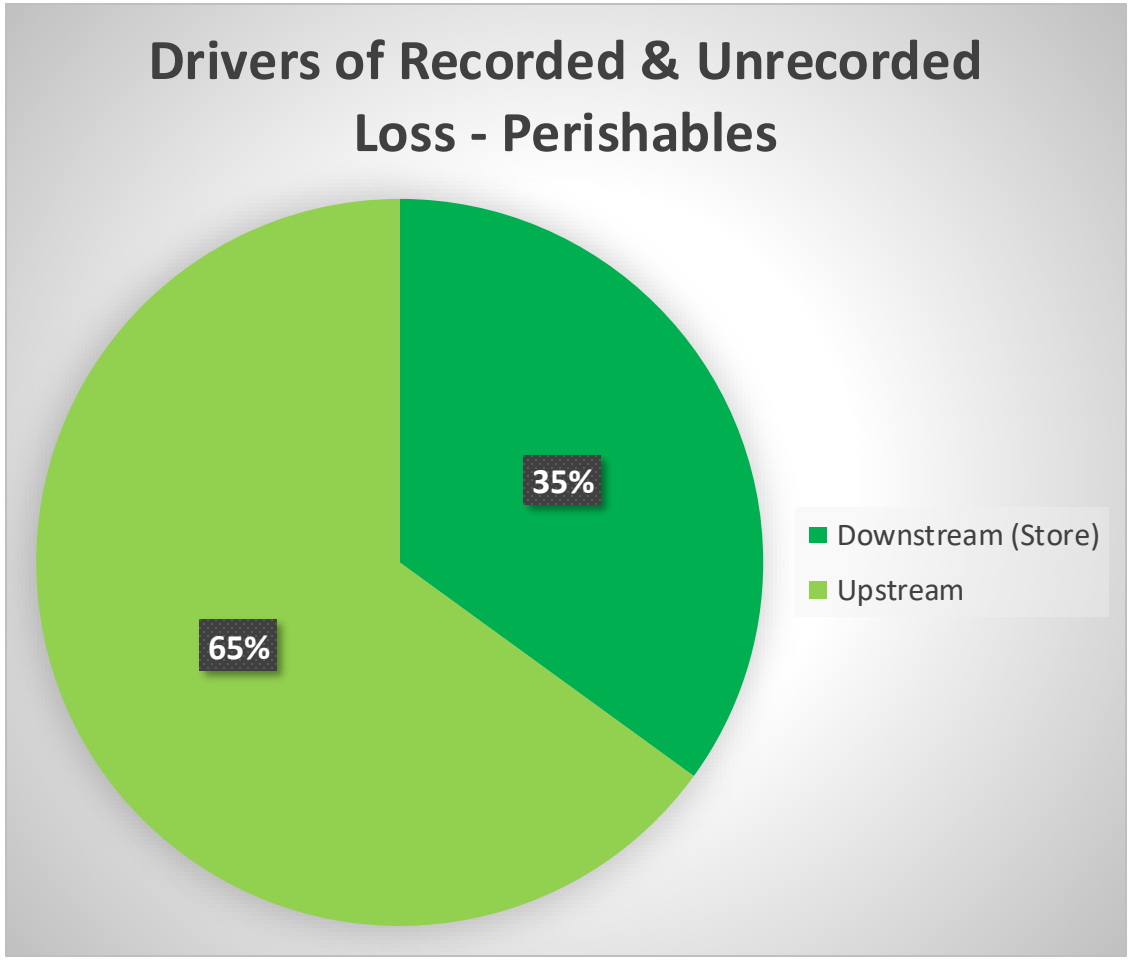
- Ordering/Forecasting
  - Inventory ordering process – causing unproductive inventory
  - Production planning - perishables
- Receiving
  - Inbound/outbound inventory verification impact DSD, 3rd party distribution, cross docked merchandise, and company owned warehouse facility impact
- Product Handling
  - Merchandising strategy - location
  - Space to sales - perishables
  - Product storage, cold chain elements, sanitation

- Administration
  - Administrative errors at store level, corporate, and supply chain
- Pricing
  - Price file management, price integrity, markdown tracking, gross margin capture
- Back Stage
  - Accounting reconciliation issues
- Accidental
  - Damages, cashier error, departmental associate error
- *Theft*
  - *Internal & external pilferage*

Source: Cap Gemini: CGEY Database: $59.2 billion in sales - 4,866 locations

3) Drivers of Store Waste are Company Wide





Source: Cap Gemini: CGEY Database: $59.2 billion in sales - 4,866 locations

4) Each Category Has Unique Challenges & Interventions

Department	Sales Distribution	Average Dollar per Item	Average Shrink % at Retail	Shrink Distribution	Top Quartile Shrink % @ retail
Grocery	41.46%	$ 1.90	0.38%	7.56%	0.17%
HBC / GM	8.57%	$ 4.01	2.89%	11.89%	2.07%
Dairy	7.21%	$ 1.79	0.39%	1.35%	0.25%
Frozen	6.65%	$ 1.98	0.32%	1.02%	0.17%
Produce	10.13%	$ 1.60	5.21%	25.34%	3.89%
Floral	0.95%	$ 6.47	8.19%	3.74%	6.19%
Meat	11.94%	$ 5.13	3.12%	17.89%	2.56%
Seafood	1.61%	$ 6.34	8.21%	6.35%	7.01%
Deli	4.76%	$ 3.23	7.67%	17.53%	5.98%
Bakery	2.43%	$ 0.89	6.55%	7.64%	5.73%
Pharmacy	4.29%	$ 38.12	-0.15%	-0.31%	
TOTAL STORE		$ 2.16	2.08%		1.64%
Non Perishable	63.89%	$ 2.02	0.71%	21.83%	0.43%
Perishable	31.82%	$ 2.39	5.14%	78.48%	4.07%
Pharmacy	4.29%	$ 38.12	-0.15%	-0.31%	
TOTAL STORE	100.00%	$ 2.16	2.08%		1.64%

Source: Cap Gemini: CGEY Database: $59.2 billion in sales - 4,866 locations

UN Code of Conduct

ENSURE PROPER TRAINING OF STAFF

ENSURE THAT ORDERED VOLUMES ARE PLANNED AND ADJUSTED TO DEMAND, IN TERMS OF BOTH QUANTITY AND QUALITY

DEFINE CLEAR SPECIFICATIONS THAT WILL PREVENT FOOD LOSS AND AVOID INTERVENTIONS, BY AGREEMENT AND COMMUNICATION WITH THE PRODUCER AND TRADERS

ENSURE THAT CONTRACTS INCLUDE APPROPRIATE MATURITY REQUIREMENTS

CONTROL PRODUCTS AND MAKE COMPLAINTS/CLAIMS WITHIN A REASONABLE TIME AFTER PRODUCTS HAVE ARRIVED AT DC / STORE

BUYER´S PREMISES (BUYER AND SELLER SHOULD HAVE A COMMON AGREEMENT ON CRITERIA AND METHOD FOR CONTROLS ANDCLAIMS)

STORE AND DISPLAY PRODUCTS IN THE SHOPS AT THE APPROPRIATE, PRODUCT-SPECIFIC TEMPERATURE

HANDLE PRODUCTS CAREFULLY AND TAKE MEASURES TO REDUCE THE RISK OF PRODUCTS GETTING BRUISED

STORE AND DISPLAY PRODUCTS APPROPRIATELY

AVOID CAMPAIGNS ENCOURAGING CONSUMERS TO BUY MORE THAN THEY CAN EAT

FIND WAYS TO USE OR SELL DAMAGED OR SUBOPTIMAL PRODUCTS

MEASURE THE AMOUNT OF PRODUCE THAT IS WASTED AND SPECIFY THE MAJOR CAUSES OF THE WASTE

IMPROVE LOGISTICS TO SHORTEN TIME FROM HARVEST OR PACKING TO RETAIL

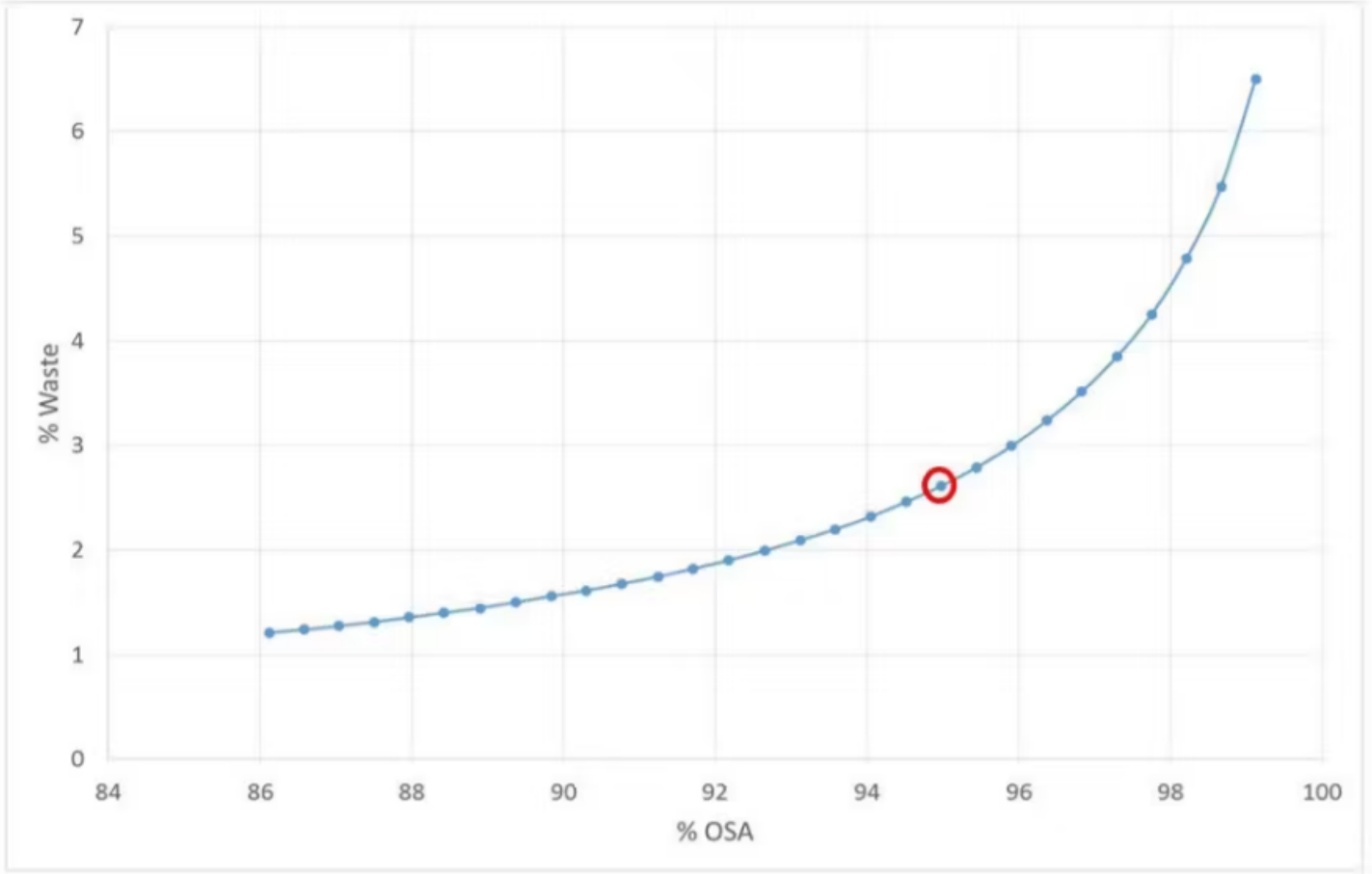
COOPERATE TO ESTABLISH UNBROKEN COOL CHAINS, AT THE APPROPRIATE TEMPERATURE FOR RESPECTIVE PRODUCTS

PLACE ORDERS AND/OR CHANGE ORDERS WITH ENOUGH TIME TO ALLOW FOR PRODUCTS TO BE CAREFULLY HARVESTED, HANDLED AND COOLED BEFORE DISPATCH

AVOID CANCELLING ORDERS CLOSE TO PLANNED DISPATCH OF PRODUCTS FROM PACKER/PRODUCER

5) The Problem of Competing Internal Priorities

Figure 3: The Efficient Frontier based on the data for the three retailers for all item-store combinations in the categories convenience, meat and fruit & vegetables.



Source: ECR Retail Loss – Sell More, Waste Less – 2016 – Broekmeulen & Van Donselaar

5) The Problem of Competing Internal Priorities

Traditionally:

- **Merchants / Buyers** – Innovation, Choice, Range, Sales, Margin, etc…
- **Supply Chain** – Cost, Speed, Truck Utilisation, etc
- **Stores** – Hours, Sales, Shrink (Recorded and Unrecorded)

Typically, the "buck" on Food Waste $$ / Budget rests with stores….maybe in a more centralised ordering context this may change?

Who is Accountable for Food Waste & Markdowns?

Merchants/Buyers/ Category	• Waste $$$ budget owned by the merchant • Waste starts with buying and ranging decisions • Focus on case sizes, breadth of assortment, shelf life and packaging
Supply Chain	• Responsible for forecasting & ordering decisions • Own the algorithm and optimised discounting reductions model • Own the dynamic assortment / don't send waste to stores model
Stores	• KPI focussed on what stores can control – adherence to waste process • Secondary KPIs to ensure stores stay within expected tolerances

Source: ECR Retail Loss – Sell More, Waste Less – 2016 – Broekmeulen & Van Donselaar

6) The Fresh Case Cover

$$Fresh\ Case\ Cover\ (FCC) = \frac{Q}{m \cdot \mu}$$

Figure 5: The average waste (as a percentage of sales) as a function of the Fresh Case Cover, based on actual waste data from 17,093 item-store combinations in 27 stores.

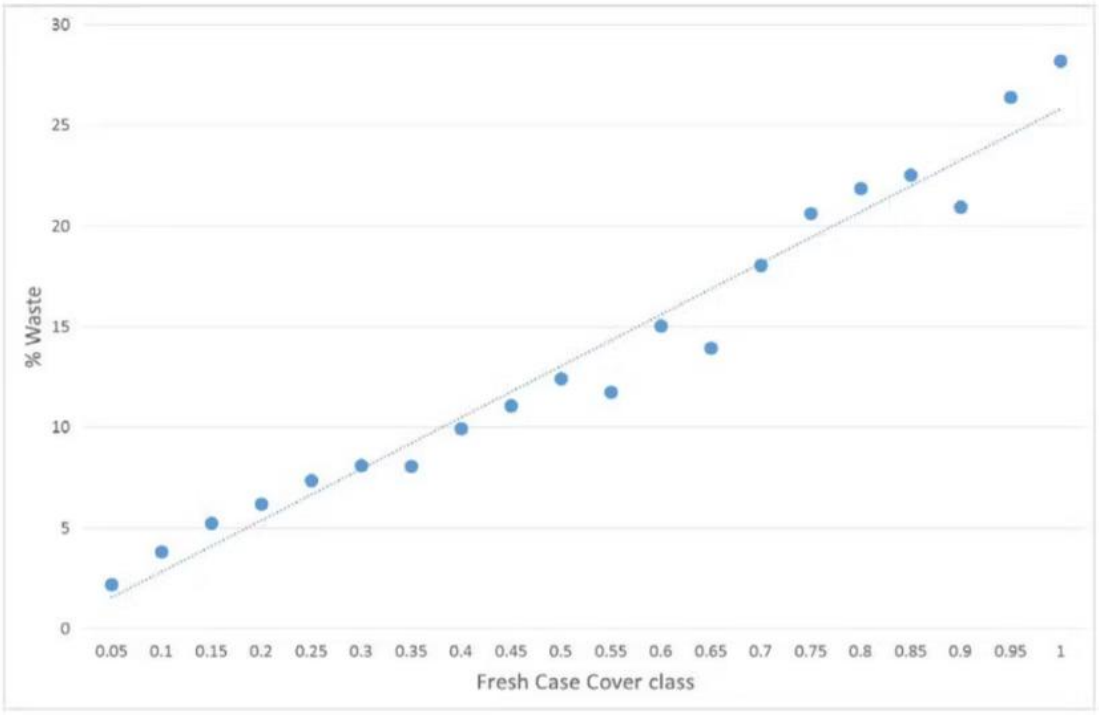


Table 5: Prioritising improvement projects by calculating the effects on % Waste reduction and on %OSA increase when the main objective is to Waste Less.

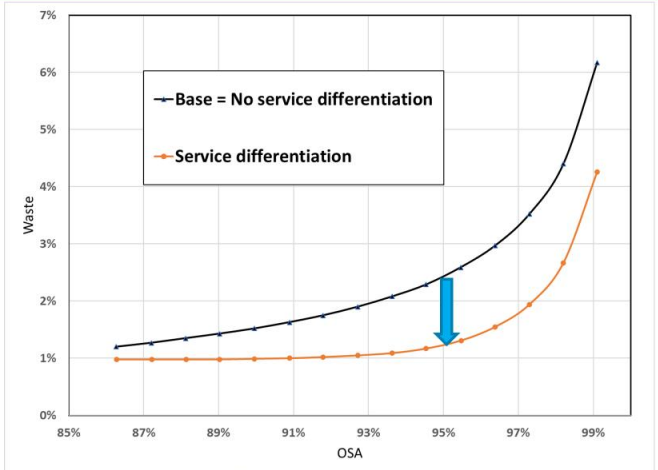
Project	*% Waste reduction*	*% OSA increase*
Increase shelf life for the store with 1 day	42.8	0.0
Unpack all SKUs in DC (case pack size store is 1)	32.5	0.0
Increase shelf life for the store with 1 day and unpack all SKUs in DC	66.3	0.0
Lower OSA with 2% for all SKUs	19.0	*-2.0*
Differentiate service levels = lower OSA with 3% for slow movers (80% of assortment) and increase with 3% for fast movers	12.0	0.2
Delist 10% from the assortment (slow mover, which results in 0.6% less sales)	7.5	*-0.6*

Packaging Example: Extends Shelf Life by 28 Days

7) Service Level Differentiation

Benefits from service differentiation

12



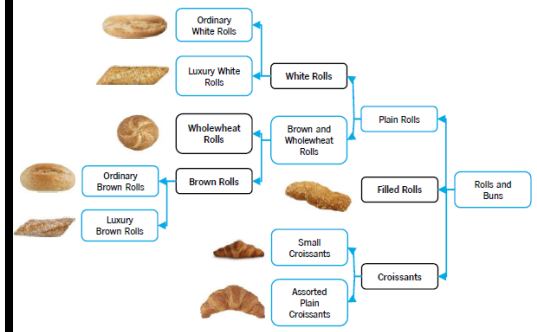
If current OSA=95%, service differentiation leads to 50% waste reduction (2.4% to 1.2%)

ECR Retail Loss

TU/e Technische Universiteit Eindhoven University of Technology

BAK Production Advice Algorithm

Substitution is the key for predicting and optimizing

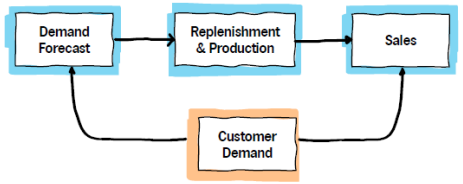


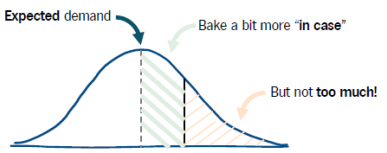
Forecast Demand

Aggregate Demand

Add Safety

Calculate Advice and Disaggregate





Round 1	Round 2	Round 3
10 Left	20 Expected Sales + Safety stock of 3	

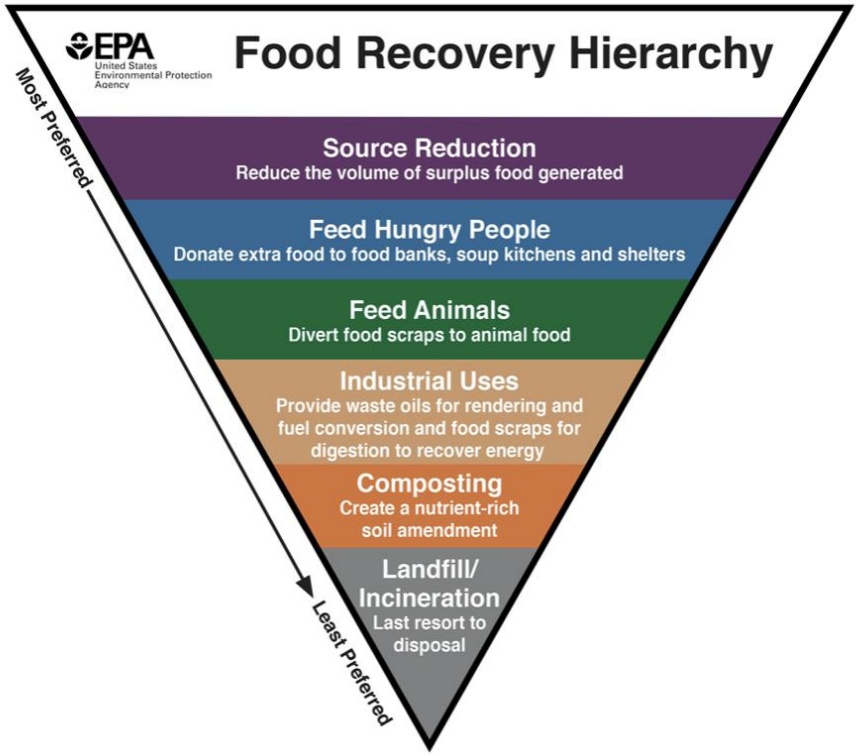
Round 2 baking advice is
20 + 3 − 10 = 13 rolls

6

8) Significant Hidden Costs of Managing Unsold Food

Historically

Future State



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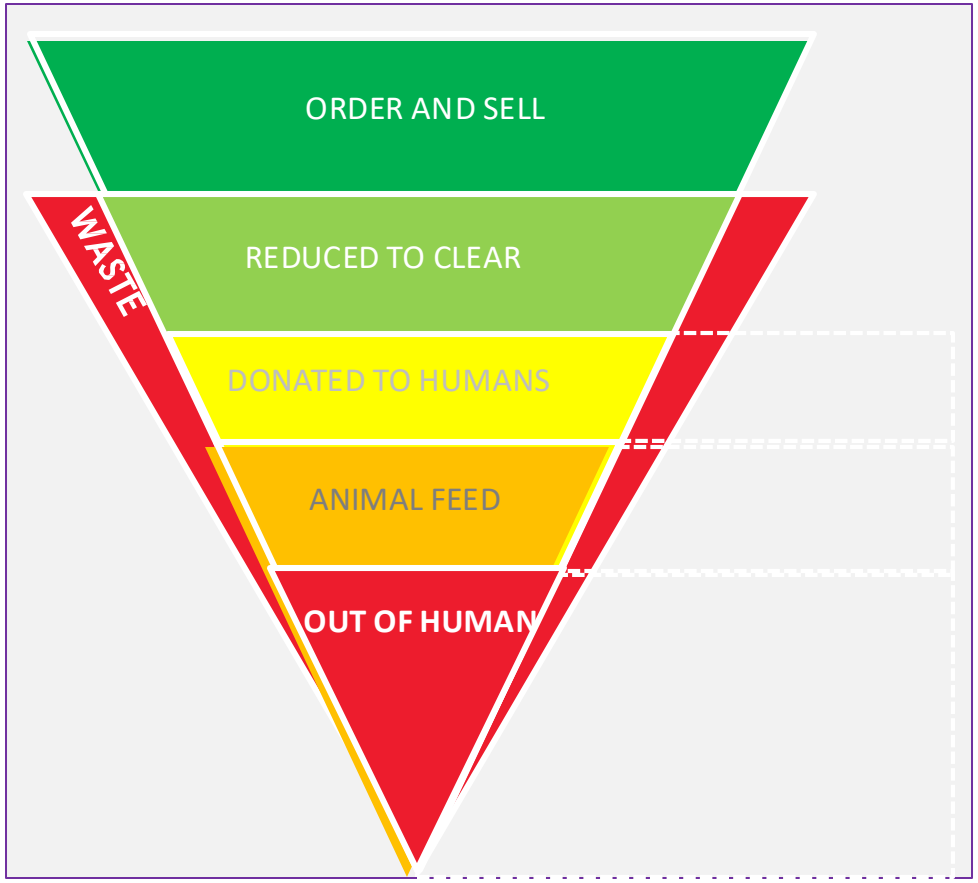
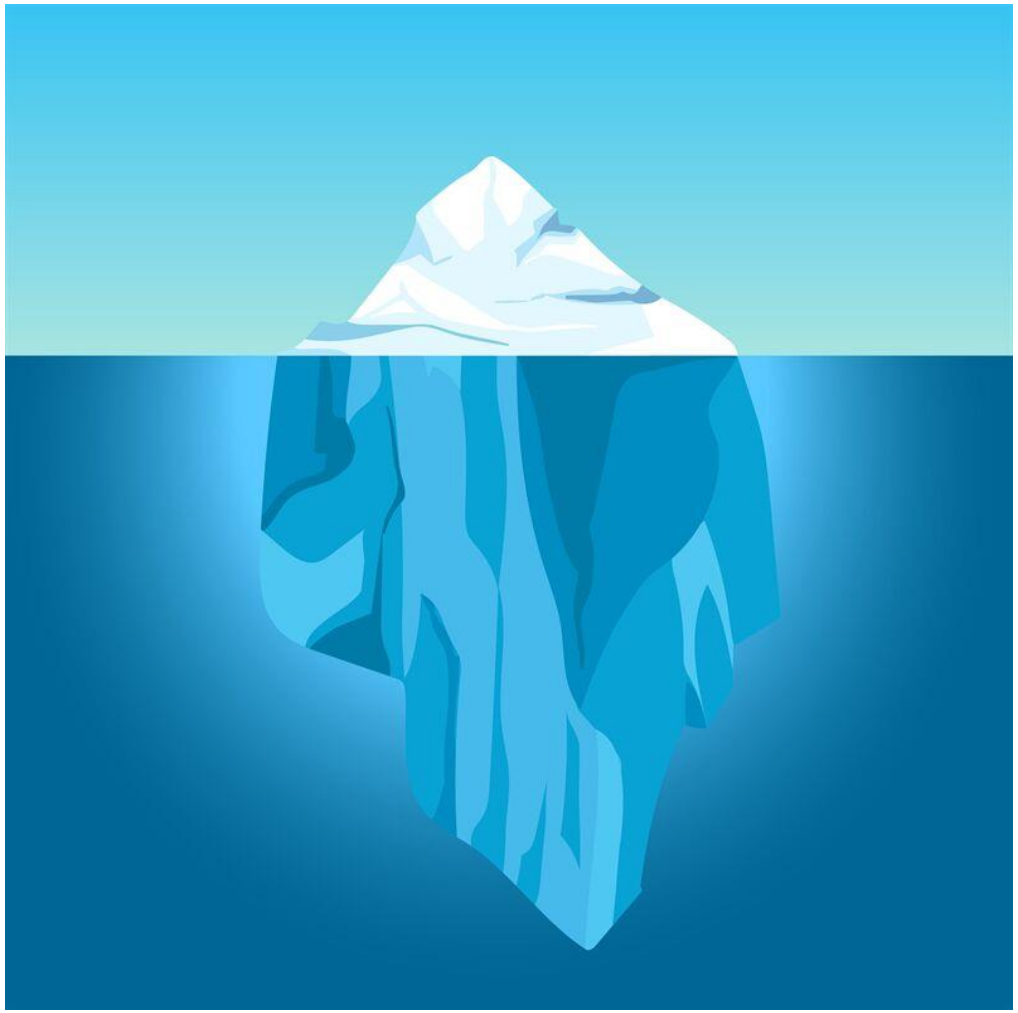


8) Significant Hidden Costs of Managing Unsold Food

1%

Cost of Food Wasted / Retail Sales



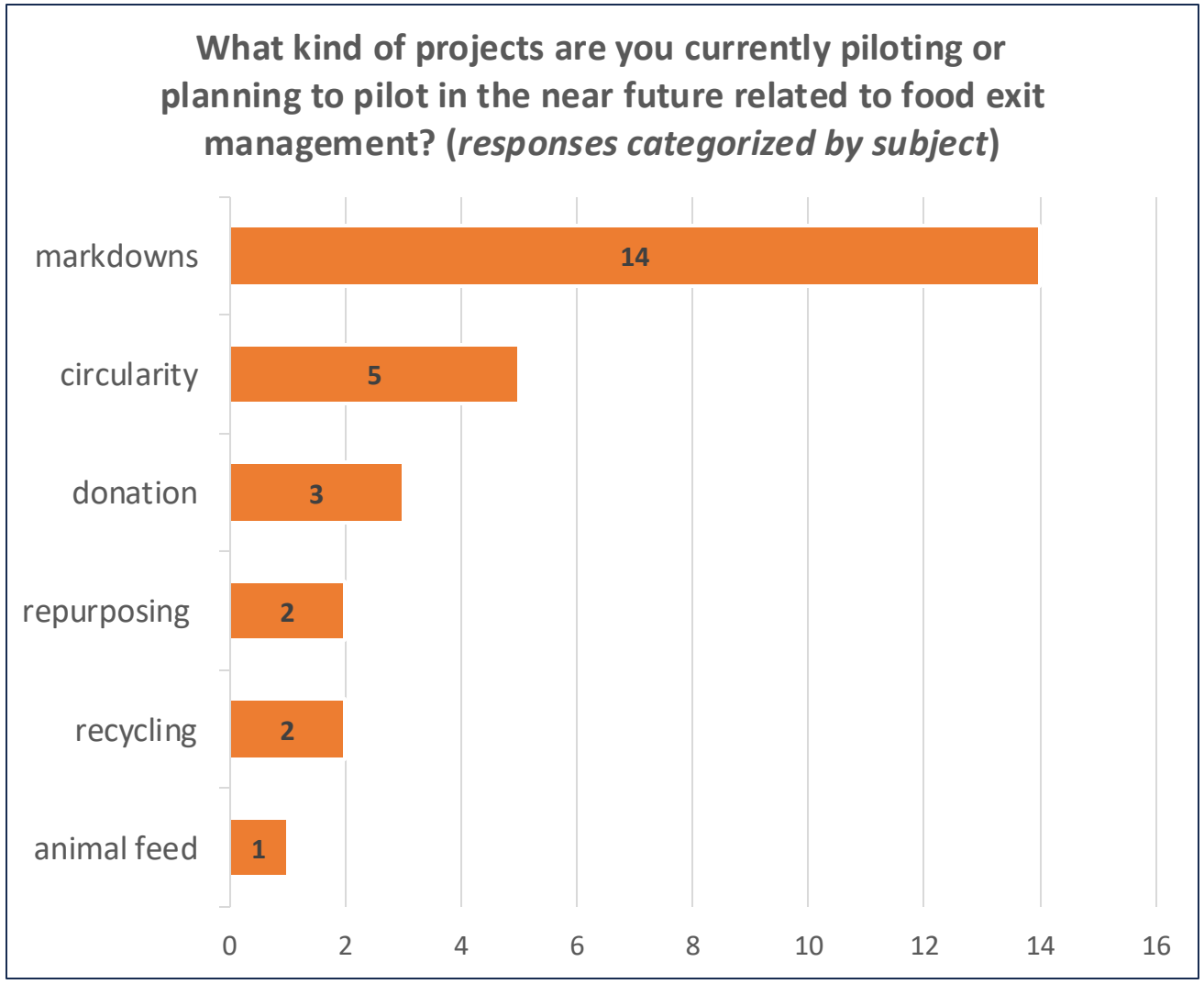
Value of Food Thrown Away at Cost of Goods

1.8%

Cost of Handling / Managing Surplus & Unsold Food / Retail Sales

Quality & Date Code Checks
Application of Markdown Discount
Removal of Unsold Discounted Product
Movement of Discounted Products
Repurposing
Donation to Charities (Handling, apps, etc)
Donation to Store Associates (Handling)
Donation to Animals (Contamination prevention, etc)
Recycling / AD (Handling, etc)
Landfill (Handling, etc)

9) Huge Innovation in Markdowns (Static is Dead! ☺)



1. *"**dynamic pricing**"*
2. *"simplify markdowns: **reduce a step**"*
3. *"change **dynamic pricing** vendor. **3 steps to 2**"*
4. *"establish **process**: 3 days earlier 30%, 1 day before 50%. **mpaltform1**: 70% at all stores"*
5. *"gradual roll out of **mplatform1**. first, we try to markdown ourselves though"*
6. *"**dynamic pricing**. extend collaboration with **mplatform1** and **mplatform3**. started surprise boxes"*
7. *"smart markdowns. pilot **mplatform2**."*
8. *"fruit and veg **mixed bags**. **2-stage markdown**, 2nd stage on the day of expiry"*
9. *"**in-house app** for markdown"*
10. *"**expand mplatform1** to all stores. markdown short-coded items for all products."*
11. *"roll out **mplatform2** to 400 stores."*
12. *"**reduce markdown levels** from 4 to 2"*
13. *"place **discounted goods online** using internal tool"*
14. *"move from fixed amount discount to % discount"*

Donate Unsold Markdowns to Colleagues?

Source: ECR Retail Loss: Professor Arzum Akkas, University of Massachusetts, Amherst. September 2024


AH kalkoenfiletreepjes
0.2 KG
12.85 PER KG
GEBRUIKEN T/M 16-05
40% KORTING
1.54
ANDERE DATUM
2.57
21928

The Future?

10) 2d / QR is coming….

2D Barcodes Enabling 7 Key Benefits and Multiple Use Cases

1. **Food Safety** - Preventing Sale of Expired items and compliance dashboards.
2. **Waste Reduction** - Out of Code Management reducing dumps and using Action Centre alerts to markdown more proactively..
3. **Expiry Date Management** - Tracking product life in stores. Inventory by Expiry Date, Replen visibility of expiry dates and Minimum Life into stores.

4. **Life Validation for Online Customers** - system guides Personal shopper and validates if the product has sufficient life for the customer
5. **Productivity -** Eliminating manually entering dates in the RF Device for Out of Code and Markdowns. System driven markdowns with Out of Code system and Action Centre alerts.
6. **Product traceability** - enabling traceability and targeted recalls / withdrawals (future).
7. **Consumer Engagement** - enabling **GS1 Digital Link QR Codes** for POS and Online (future). In addition to the above benefits of using GS1 DataMatrix enabling: Product information digitally such as Nutritional Information, Health Star rating, Australian Recycle information

More Use Cases

- ✓ Correct weight of variable weight articles after promotion or markdowns
- ✓ Best available price for variable weight items before or after promotion, no need to relabel the item.
- ✓ Behind the Counter articles can be marked down from the Deli printer
- ✓ Trace labels for Behind the counter articles

TECHNOLOGY & SUPPLY CHAIN

Tesco to pilot checkout scannable on-pack QR codes in 'second barcode revolution'

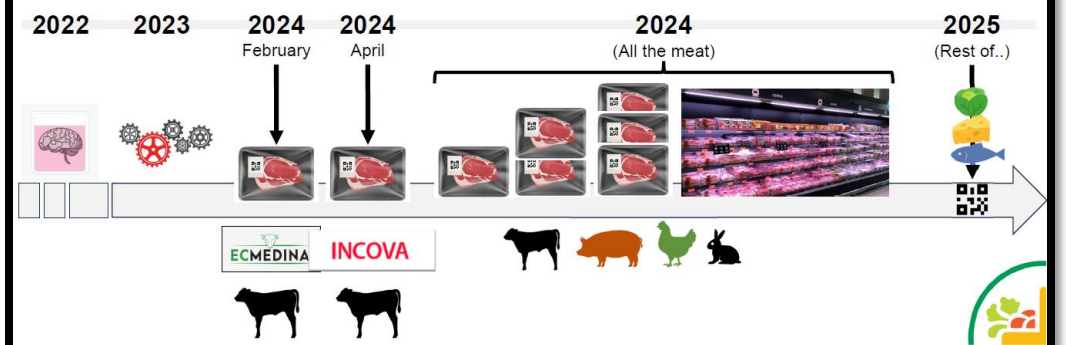
By Steve Farrell | 26 June 2024 | 3 min read

Proyect 2D Barcode — MERCADONA

The 2d Databar tour and Next steps.

Our conclusions are very optimistic, our suppliers are preparing, and we **will implement the QR** ***(GS1 Digital link)*** on all variable weight packaged products.

Close contact with suppliers and **GS1 (AECOC)** is very important in this journey.



In Stores NOW

Ten Years – Ten Key Learnings!

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Questions?

- What was the same?
- What was new?
- What was different?
- What ideas can you take back to the business?
- What was missing?

Thank you

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