



**Biomass
Biorefinery
Network**

4th BBNet Conference

**The future prospects for biorefining:
Feedstocks, technologies and products**

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Session 5: The Untapped Potential of Food Waste

BBNet 4th Annual Conference October 2025

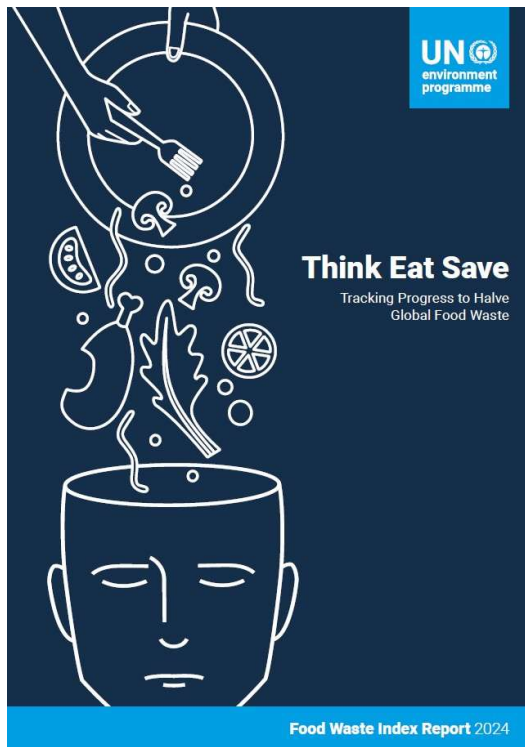
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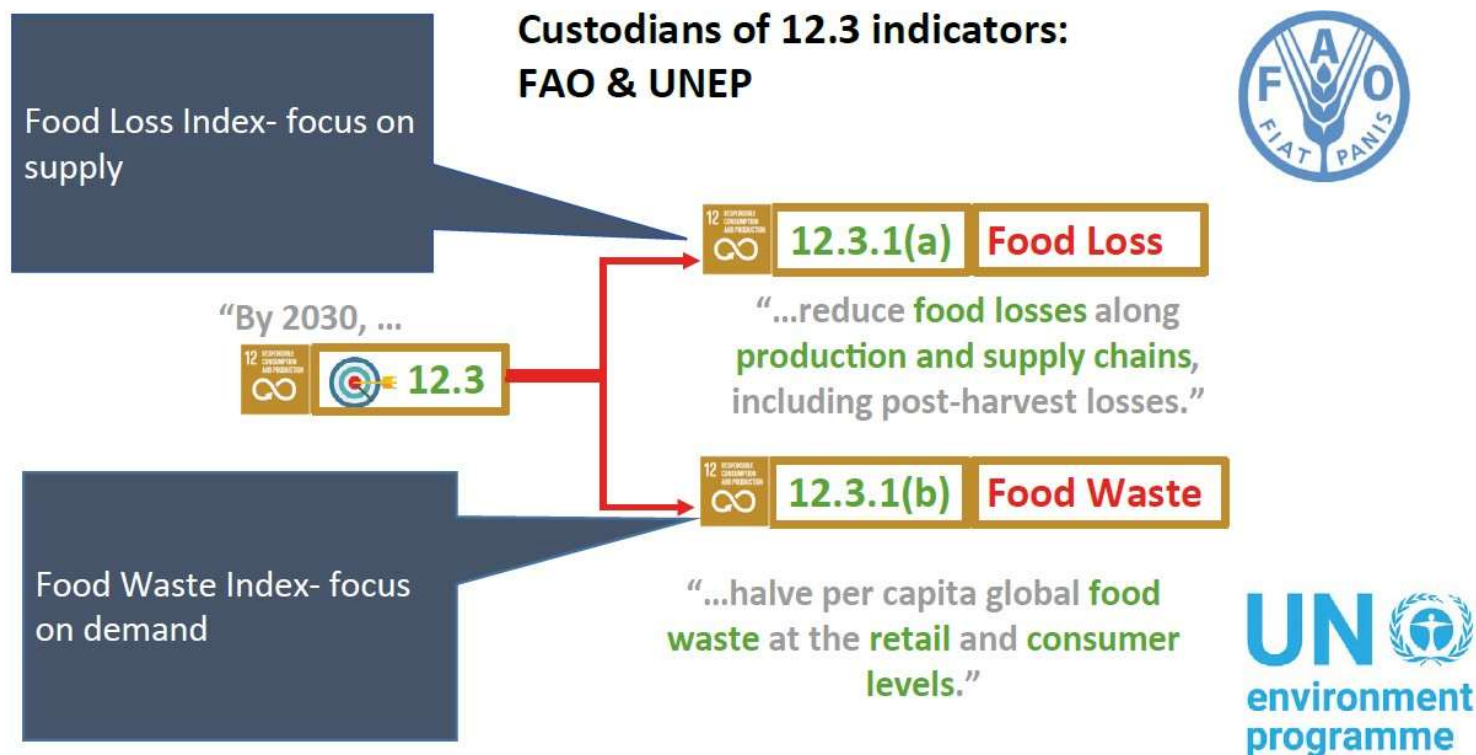


A global effort



United Nations Environment Programme (2024) *Food Waste Index Report 2024. Think Eat Save: Tracking Progress to Halve Global Food Waste*. Available at: <https://wedocs.unep.org/20.500.11822/45230> (Accessed: 13 October 2025)

Defining food loss and waste



The global consequences of food waste

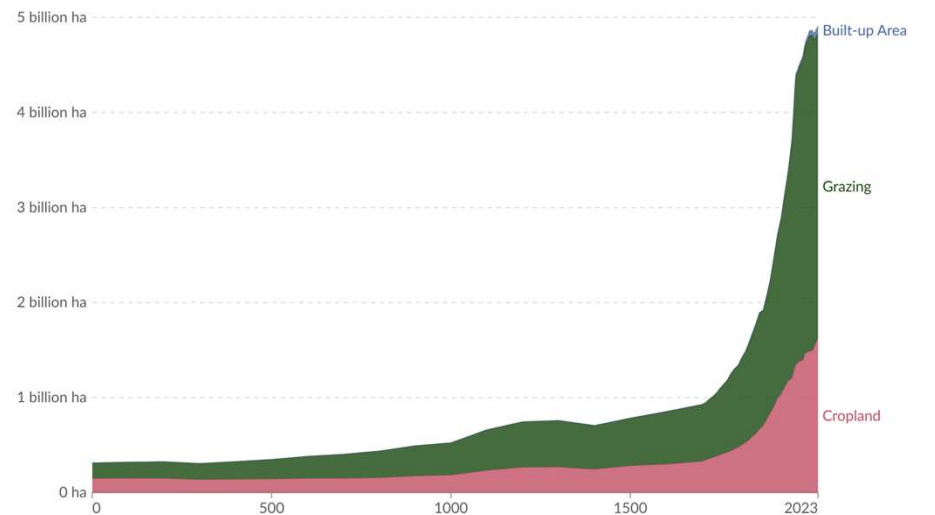
- 2022 data from the 2024 UNEP report
- 1.05bn tonnes of food waste across retail, food service and households
- 8-10% of total GHG emissions
- 783m people affected by hunger
- Equates to around 30% of agricultural land

The global consequences of food waste

- 2022 data from the 2024 UNEP report
- 1.05bn tonnes of food waste across retail, food service and households
- 8-10% of total GHG emissions
- 783m people affected by hunger
- Equates to around 15% of all habitable land

Land use over the long-term, World

Total land area used for cropland, grazing land and built-up areas (villages, cities, towns and human infrastructure).



Data source: HYDE (2023)

OurWorldinData.org/land-use | CC BY

Where is food lost and wasted?



Accessing food surplus and waste



The food waste hierarchy for England

- 1.Prevent surplus and waste arising.
- 2.Redistribute surplus food and drink.
- 3.Make animal feed from former food.
- 4.Process surplus food to make biomaterials.
- 5.Recycle - anaerobic digestion and composting.
- 6.Recover waste by land-spreading.
- 7.Recover energy from waste.
- 8.Dispose - send to sewer and landfill.

Our speakers

- Mark Richmond, WRM, “Organic waste as a feedstock for bio industries”
- Vic Harper, The Bread and Butter Thing, “Feeding people first: Why edible surplus belongs on plates”
- Paul Buxton, Samworth Brothers, “Barriers and enablers for further segregation at source”
- Panel discussion including Mark Gronnow, Biorenewables Development Centre, “Barriers and enablers for scaling segregation to aid valorisation opportunities”

Discussion



Organic waste as a feedstock for bio industries



WRM Make it Possible

Sources of organic waste & priority streams

*“Organic waste arises in a wide range of stream and fractions. **The Environment Act 2021** is creating a particular policy and market driver municipal organic wastes such as household food and garden wastes”*



Current treatment routes – food waste

- Anaerobic digestion has grown rapidly and is the primary and preferred treatment technology
- Produces biogas and nutrient rich digestate
- Categorised as recycling (waste hierarchy)
- Significant decarbonisation of gas grid – often positioned as a “transition fuel”

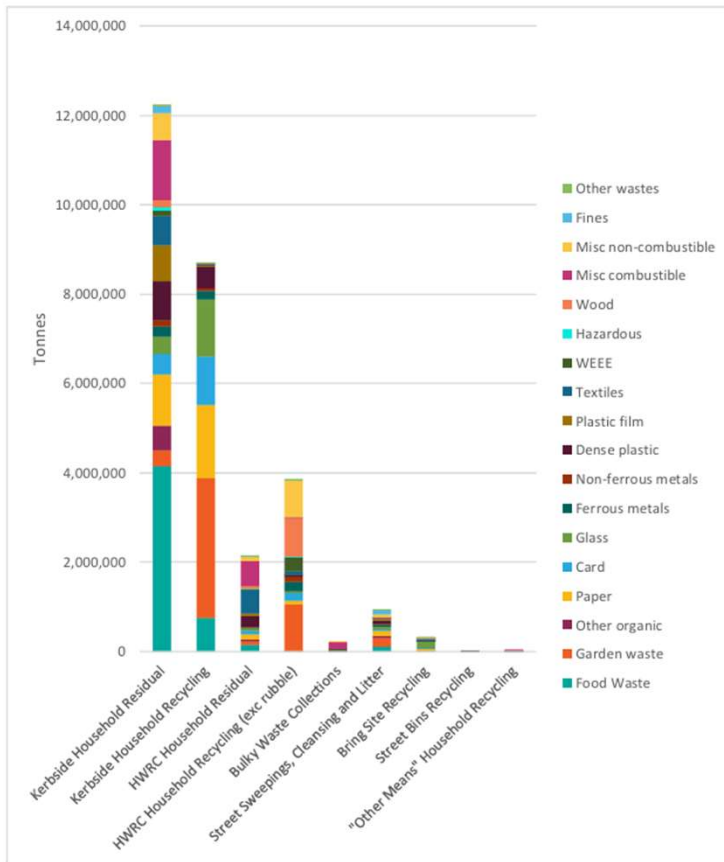


Current treatment routes – garden waste

- Open windrow composting is a long-established process using limited infrastructure
- Produces compost and “biomass oversize”
- Categorised as recycling (waste hierarchy)
- Delivers agricultural benefit and provides a low-grade biofuel product



How much organic waste arises and is recycled?

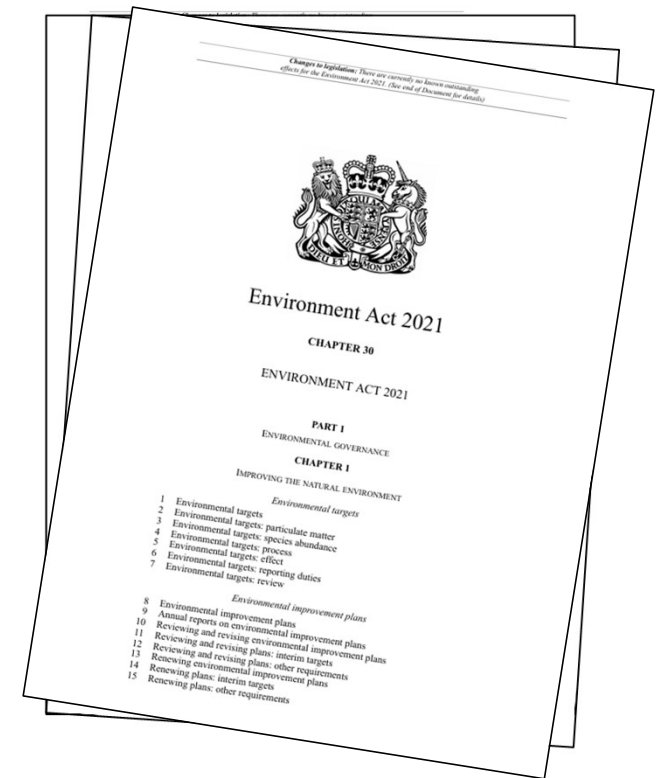


Source: WRAP

- c.10 million tonnes of garden and food wastes in UK household waste stream
- c.0.5 million tonnes of household food waste collected for recycling
- c.3.6 million tonnes of garden waste collected for recycling
- Over 4 million tonnes of organic waste remains in residual waste stream: **a problem, a policy focus and a circular economy opportunity.**

Policy drivers – the environment act 2021

- 65% municipal waste recycling target by 2035.
- “Simpler Recycling” collections policy being implemented across England.
- Standard set of recycling materials to be collected by authorities.
- Household food waste collections to be implemented by March 2026.

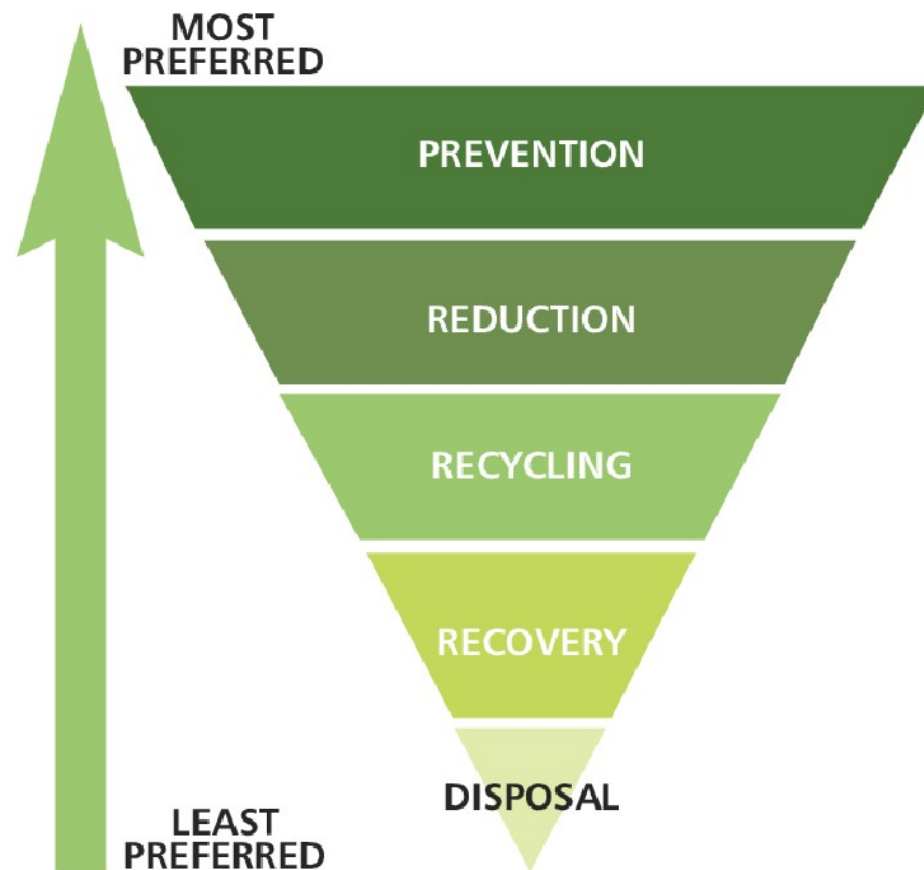


Policy drivers – increasing tonnages for treatment

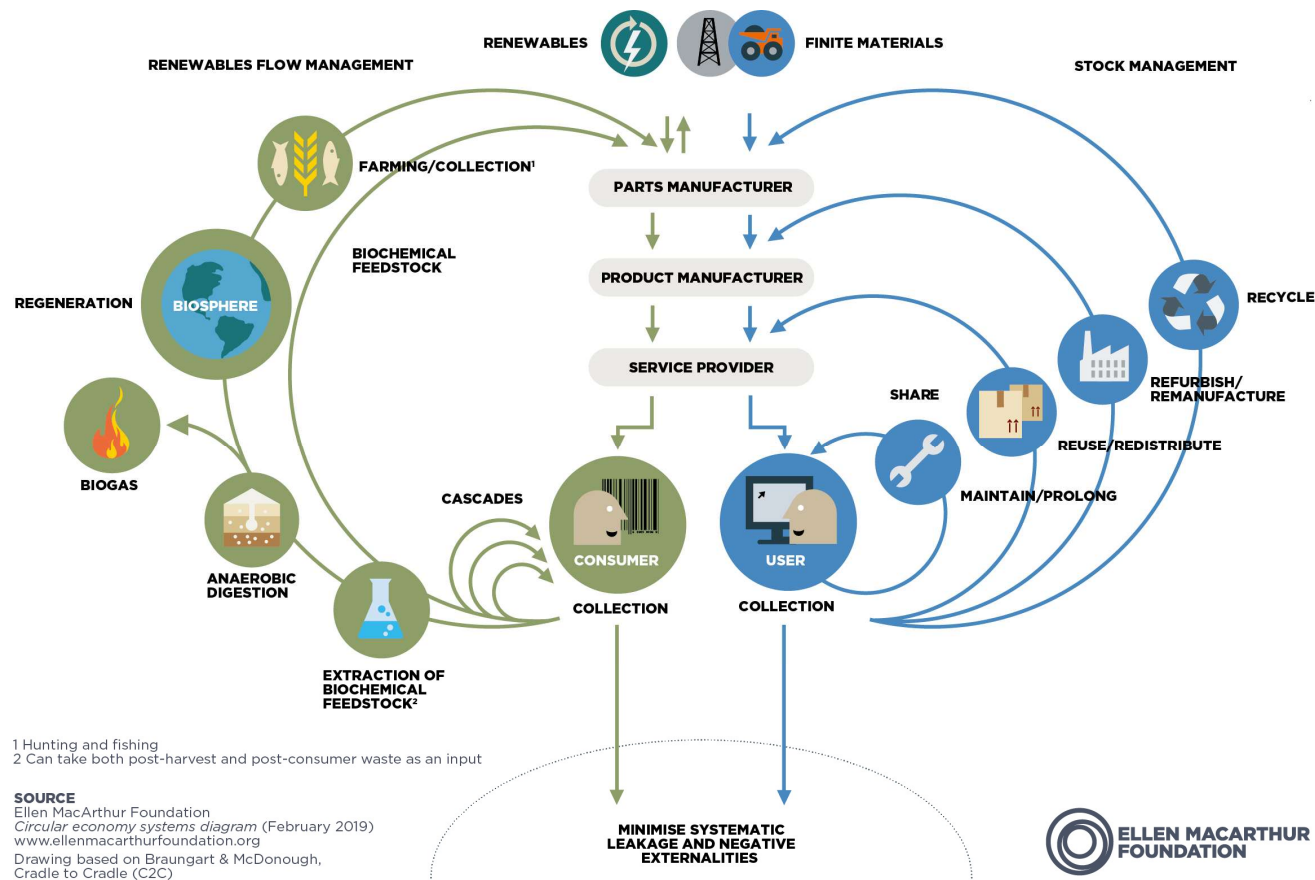
50% of English local authorities do not presently collect food waste. What will the impact of collections in these 160 Council areas be?

Capture Rate	Baseline	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Market Growth (tonnes per annum)	N/A	400,000	800,000	1,200,000	1,600,000	2,000,000	2,400,000	2,800,000	3,200,000	3,600,000	4,000,000
Total Collections (tonnes per annum)	500,000	900,000	1,300,000	1,700,000	2,100,000	2,500,000	2,900,000	3,300,000	3,700,000	4,100,000	4,500,000
	Increases with policy roll out	EU Average 26%	Commonly observed range	Welsh Average 56%	The challenge! Driving behaviour change to attain high capture rates						

Conceptual drivers – waste hierarchy



Conceptual drivers – circular economy



Opportunities for bio-based industries

How do we
stop system
leakage?

What opportunities
exist for by-
products?

What are the opportunities
for biogas beyond (current)
energy production?

2025

2035

How can we
improve existing
routes?

How can new
technologies valorise
materials?

What additional funding
can high value products
generate to attain
highest capture rates?

Find out more...

Mark Richmond



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<https://wrm-ltd.co.uk/white-papers/local-authority-food-waste-market-report/>



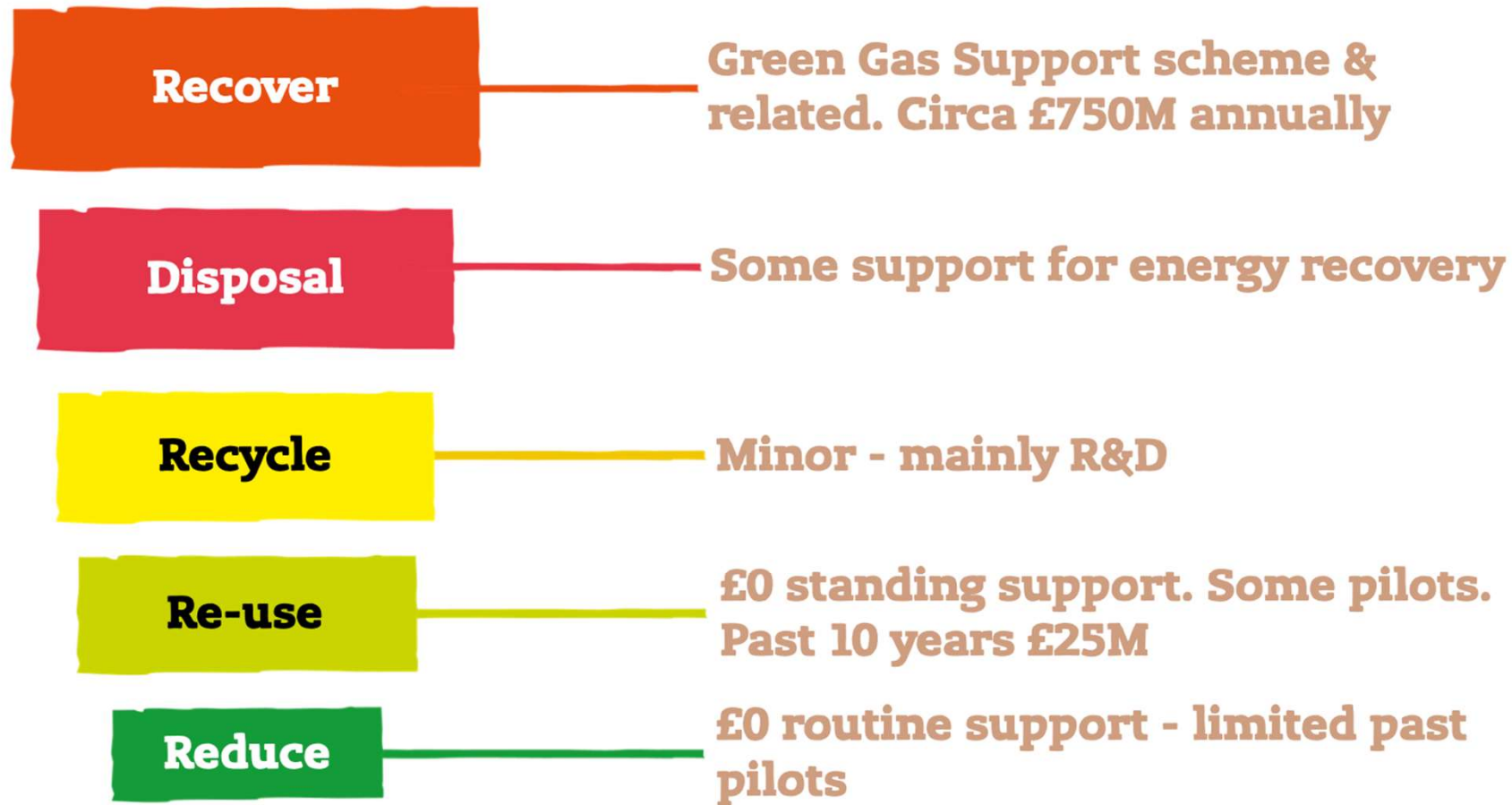
**The
bread
and
butter
thing.**

Put the
money
where their
mouths are!

In the UK today we subsidise wasting edible food under the banner of sustainability.



Where does the money go?



The current reality...

- AD offers easy disposal and potential revenue stream.
- Food industry view it as low risk
- Redistribution seen as complex in comparison:
 - Maintain food safe standards.
 - No official service agreements.
 - People, not process led.

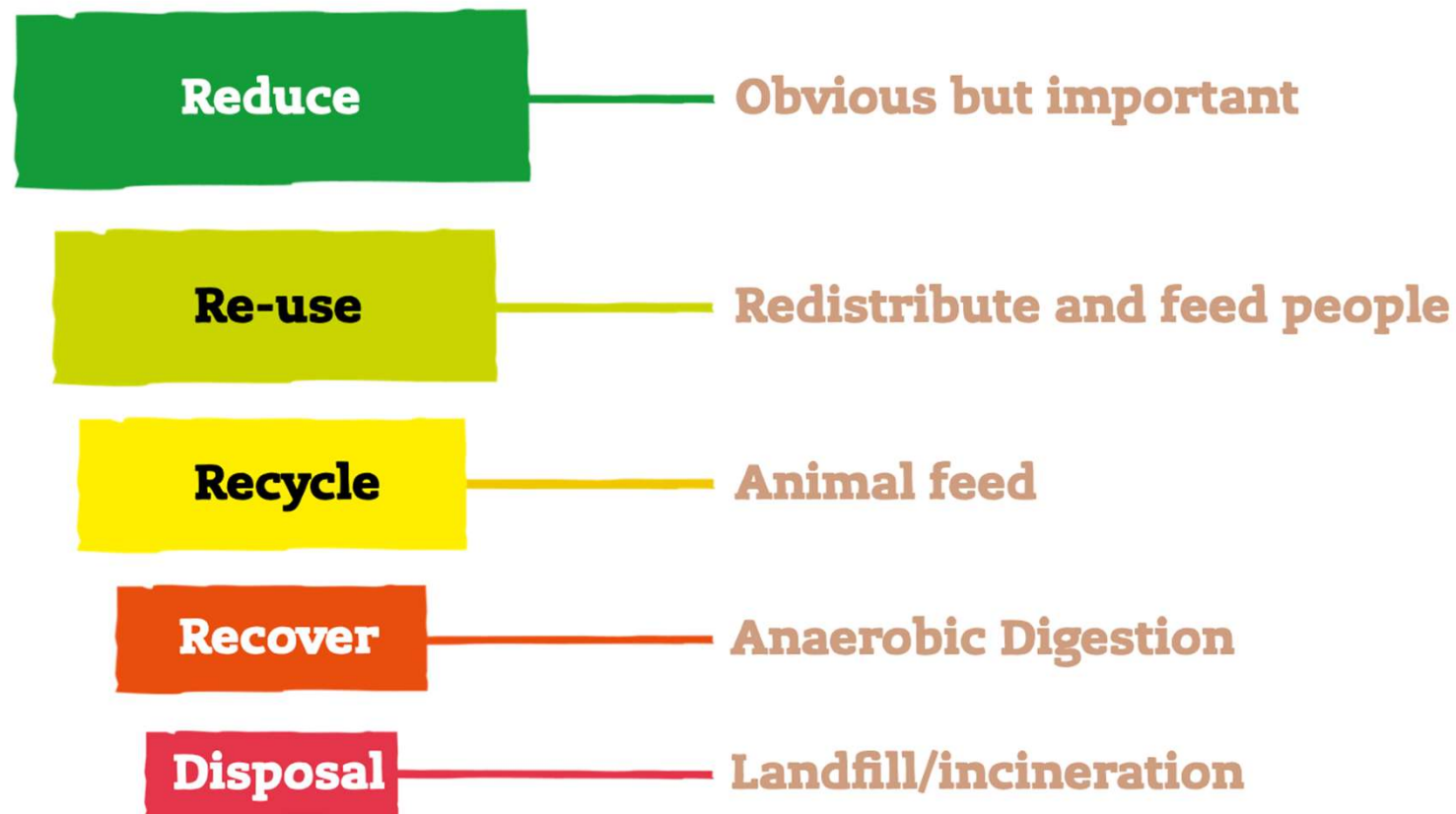
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Convenience ≠ best practice



DEFRA hierarchy

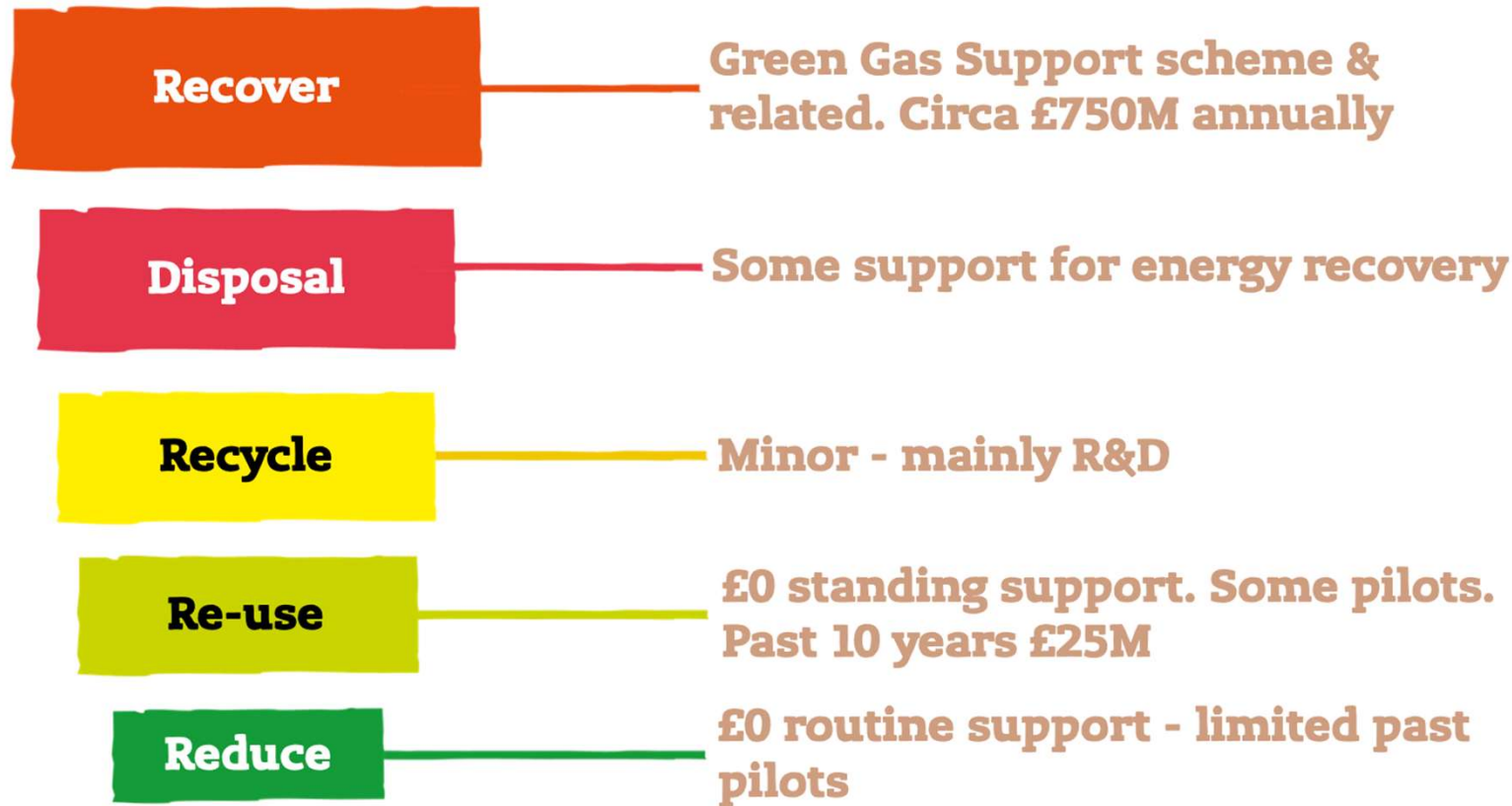


Policy says: "Feed People First". Practice says: "Feed Digesters First".

Subsidies drive behaviour...



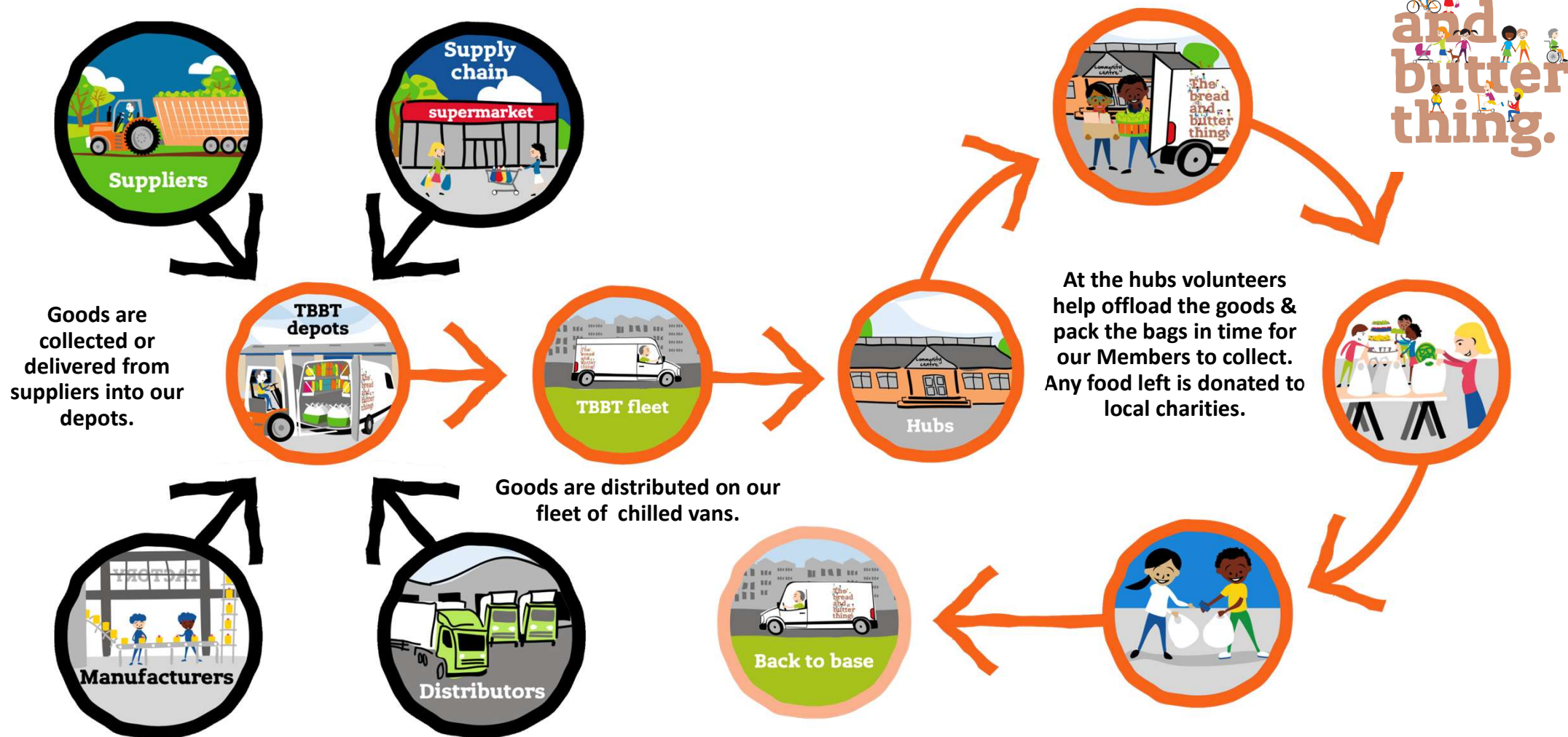
Where does the money go?



Subsidies create a structural pull towards AD



Redistribution works



The difference we make

The
bread
and
butter
thing.

In the past 12 months:

- Provided 20M meals to our members stopping 10,000 tonnes of food from going to waste.
- 145 Food clubs across the country.
- Over 120,000 registered families.
- Over 14,000 people have stopped or reduced their food bank usage.



Policy can shift the balance

Reduce

Re-use

Recycle

Recover

Disposal

Recover

Disposal

Recycle

Re-use

Reduce

- Introduce mandatory food waste reporting.
- Enforce the food waste hierarchy.
- Review the subsidy levels of AD v redistribution.



You have the evidence and influence.

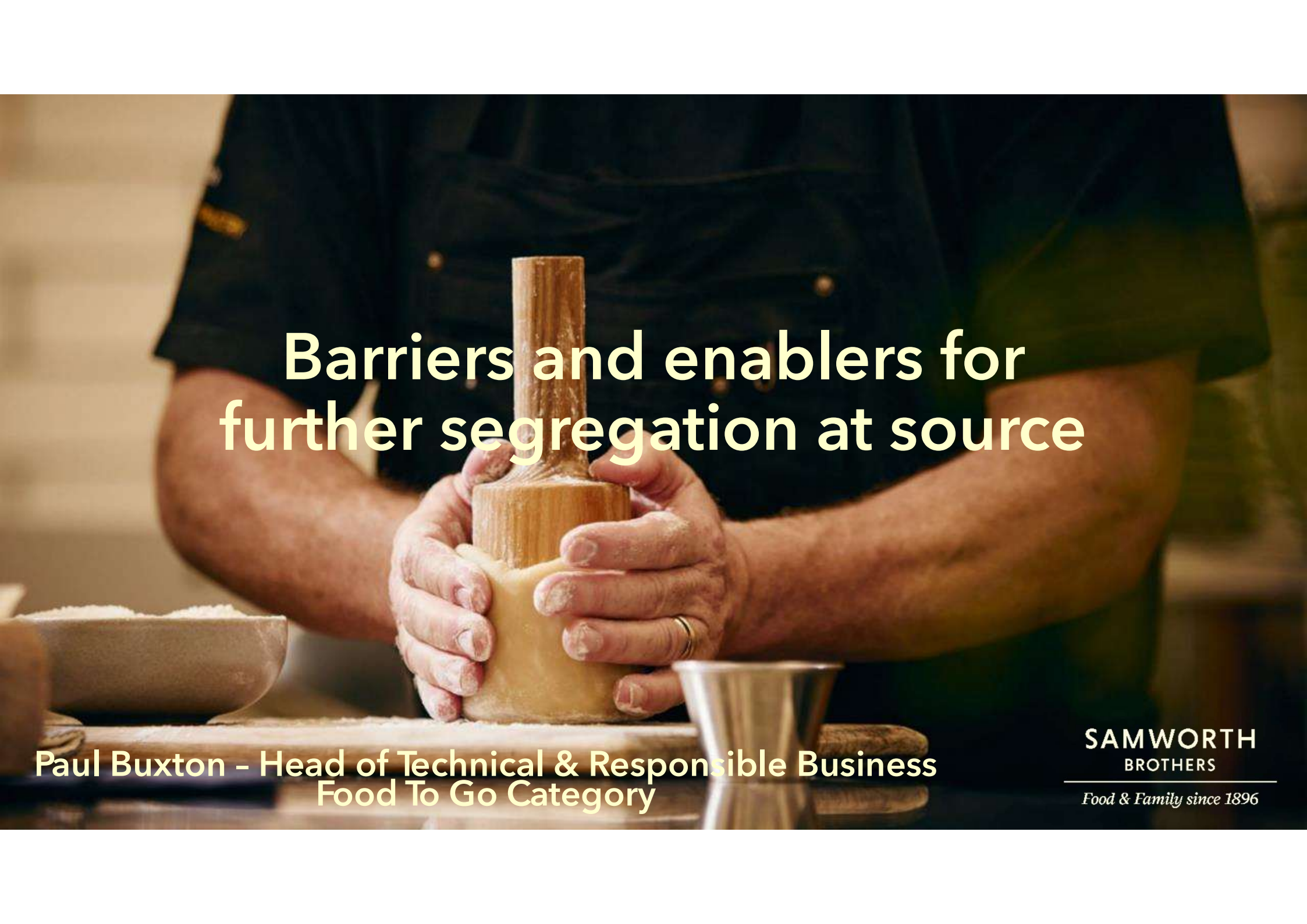
- Academics: quantify carbon/social impact differentials, challenge subsidy models.
- Policymakers: ensure hierarchy is enforced through incentives.
- Sector: share data, collaborate, challenge “easy” waste routes.

The
bread
and
butter
thing.



Feed people first.





Barriers and enablers for further segregation at source

**Paul Buxton - Head of Technical & Responsible Business
Food To Go Category**

**SAMWORTH
BROTHERS**

Food & Family since 1896

Barriers and enablers for further segregation at source

Samworth
Brothers

Opportunity

Barriers

Enablers

Industry
Innovations

Do more

SAMWORTH BROTHERS

**Est.
1896**

*Founded by George
Samworth with origins
in the meat industry*

**Family
OWNED**

*4th Generation
family business*

**15
BAKERIES**

*Bakeries and kitchens
with a vast array
of capabilities*

**10,000+
PEOPLE**

*Our people are
our greatest asset*

**Turnover
£1.6bn**

*Across our portfolio of
businesses and brands*

**Financially
STABLE**

*With significant
capability to invest in profitable
growth*

**Quality
FOOD**

*A passion for food
and innovation to
meet consumer needs*

**Built on
PARTNERSHIPS**

*Strong and lasting
customer relationships
for mutual benefit*

**SAMWORTH
BROTHERS**

SAMWORTH BROTHERS

CATEGORIES



Savoury Pastry



Food to Go



Meals



Protein

BRANDS



SUPPORT

SAMWORTH
BROTHERS
FOOD FOR NOW

16 Sales Hubs across
the UK, 200 Vans

SAMWORTH
BROTHERS

SUPPLY CHAIN

4 Chilled
Distribution Hubs,
200 trailers



Microbiological and chemical
testing for the food industry

SAMWORTH
BROTHERS

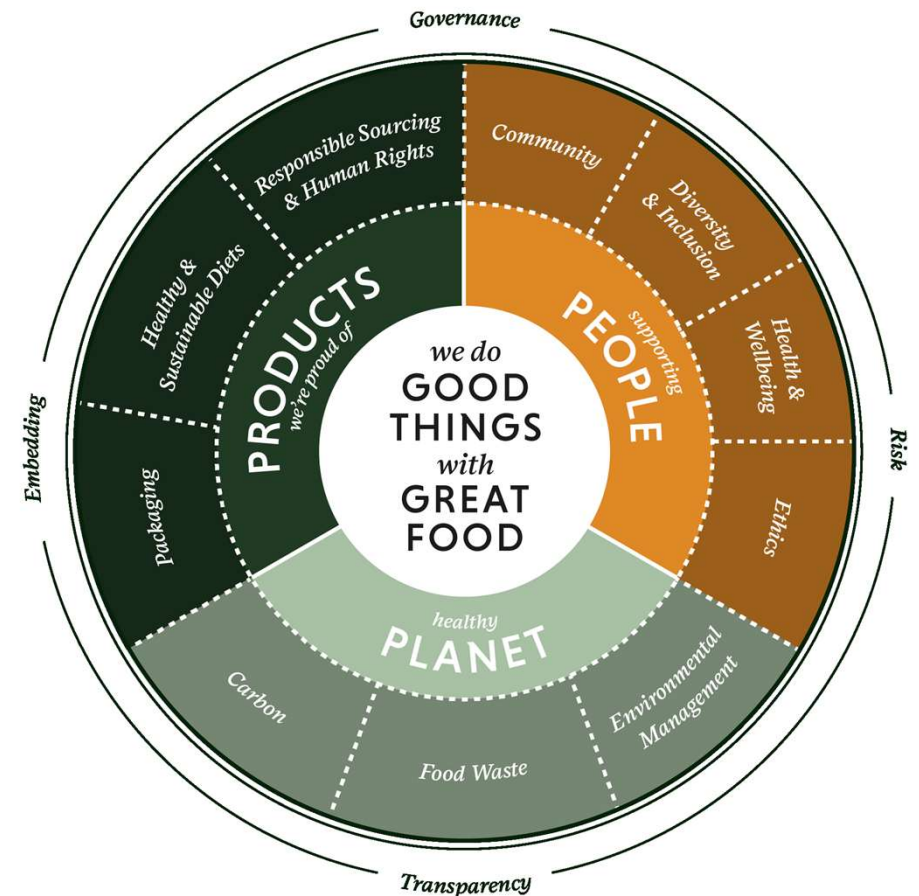
Making **GOOD** things happen

We follow our purpose,
we do GOOD THINGS with GREAT FOOD

We take a responsible approach to business, with our purpose at the heart. We believe we have three main areas of impact:

1. Our impact on People
2. Our impact on the Planet
3. The impact of our Products

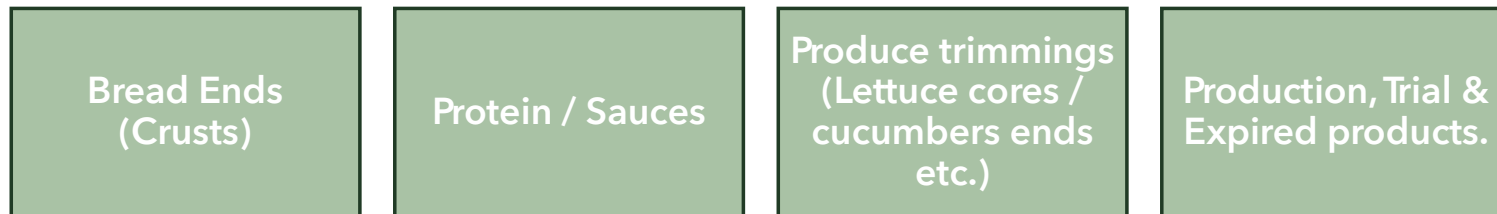
In each of these three areas we have defined challenging goals and set a pathway to meet them.



SAMWORTH
BROTHERS

The Scale of the Opportunity

- The food industry generates significant volumes of unavoidable food waste
 - 9.5 million tonnes of food waste, with an estimated 3.2 million tonnes currently being processed through anaerobic digestion (AD) facilities (UK in 2024) (1).
 - Samworth Brothers FTG created 7000 Tonnes of Food Waste in 2024.



This waste is rich in nutrients and organic matter, making it ideal for valorisation into:



Barriers

Anaerobic digestion (AD) and composting are common but underutilise the full value.

Waste Hierarchy (2)

- Ranks waste management methods from most to least environmentally friendly:
 - prevention,
 - reuse,
 - recycling,
 - recovery (AD),
 - and disposal.

Segregation at source

- Must not compromise food safety, hygiene standards or introduce cross-contamination risks, particularly in high-care environments
- Bread ends not always suitable for animal feed (regulation / risk of cross contamination)

Logistics and contamination

- Lack of consistent waste streams and the dynamic nature of production schedules further complicate standardisation efforts.

Regulatory constraints on reprocessing food waste

- Waste food is still food and must be fit for human / animal consumption.

Enablers

Food Waste redefined to Surplus.

Increased regulatory and stakeholder pressure

- For sustainable practices which support valorisation

Technological advancements

- In waste tracking, processing and growing internal awareness of environmental impact.
- Needs to be scalable and flexible for handling mixed food waste streams

Collaboration with waste management partners

- Can unlock efficiencies and improve compliance.

Digital tools and data analytics

- Offer potential to monitor waste generation patterns and optimise segregation strategies.
- Data-driven insights to quantify environmental and economic benefits.

Industry Innovation

- Lots of start ups - creating more food from surplus food.
 - Needs special treatment / management.
 - Bread Ends into:

Beer

Pasta

Crisps

- Will always be excess / not for human consumption
 - Numerous papers / examples converting bakery waste into bioethanol
 - Use of fruit and veg trimmings for natural pigments and biopolymers.
 - Partnerships with startups exploring microbial fermentation of food waste

Do more

- Let's move beyond disposal and unlock the full value of food waste.
- The food industry is ready to:
 - Co-invest in pilot projects
 - Share data and waste streams
 - Support policy reform
- We invite BBNet researchers and innovators to collaborate on real-world solutions.

References

1. [Transforming delivery of anaerobic digestion in the United Kingdom](#)
2. <https://assets.publishing.service.gov.uk/media/5a795abde5274a2acd18c223/pb13530-waste-hierarchy-guidance.pdf>



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