

Food packaging, health and the environment:
What questions should we ask when looking
for a way forward?

Zurich, 24 October 2019

Food Packaging Forum

Dr. Arturo Castillo Castillo

a.castillo@imperial.ac.uk

Route map

1. How did we get here?

(On evolution paths and value chains)

2. Commonalities between the ocean plastic and food packaging debates

(What is the problem?)

3. Room for convergence?

(Key questions)

How did we get here?



➤ Nothing happens... until something happens

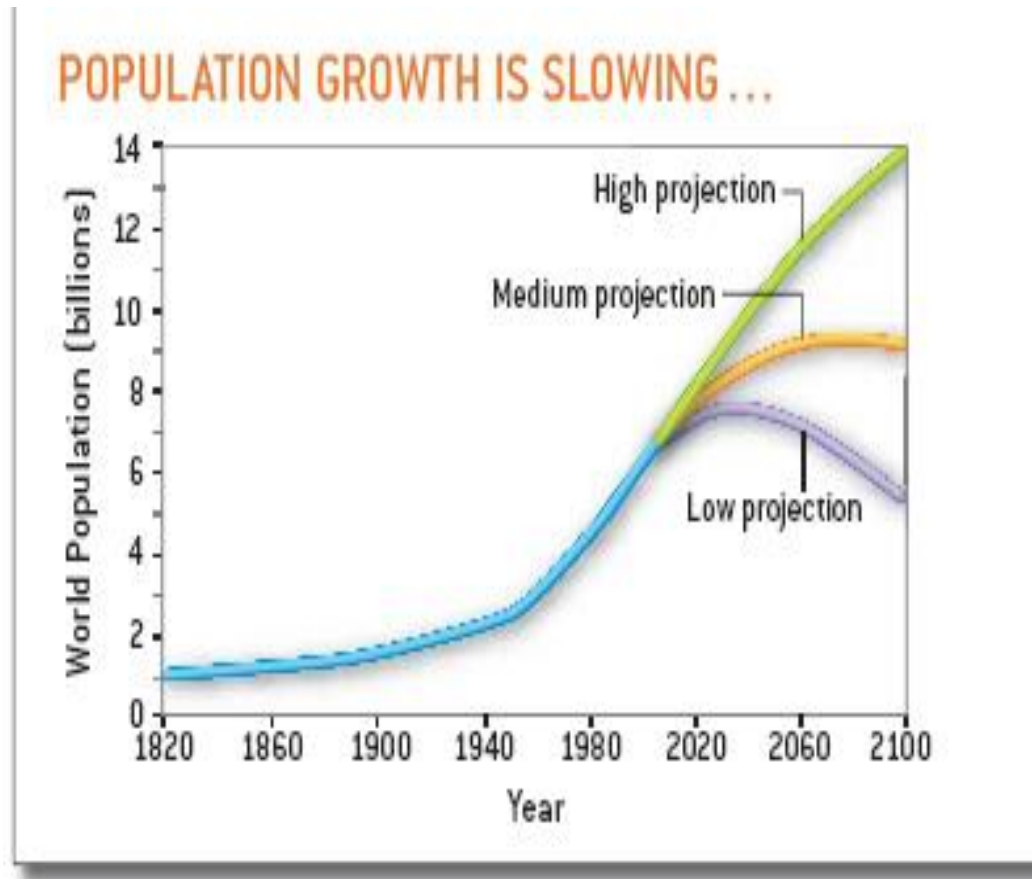
How did we get here?

Demographic trend

Δ products: Food & Non-F

Δ transport distances

Δ preservation: F & Non-F



Foley (2010)

How did we get here?

Socio-economic trends

Δ urban than rural

Δ women in the workforce

Δ commuting time per family

Δ divorce rate

Smaller families

International supply chains

Lacking certification

Need to minimise food waste

Unaddressed externalities

Inflation



How did we get here?

Global trend

World plastics production grows

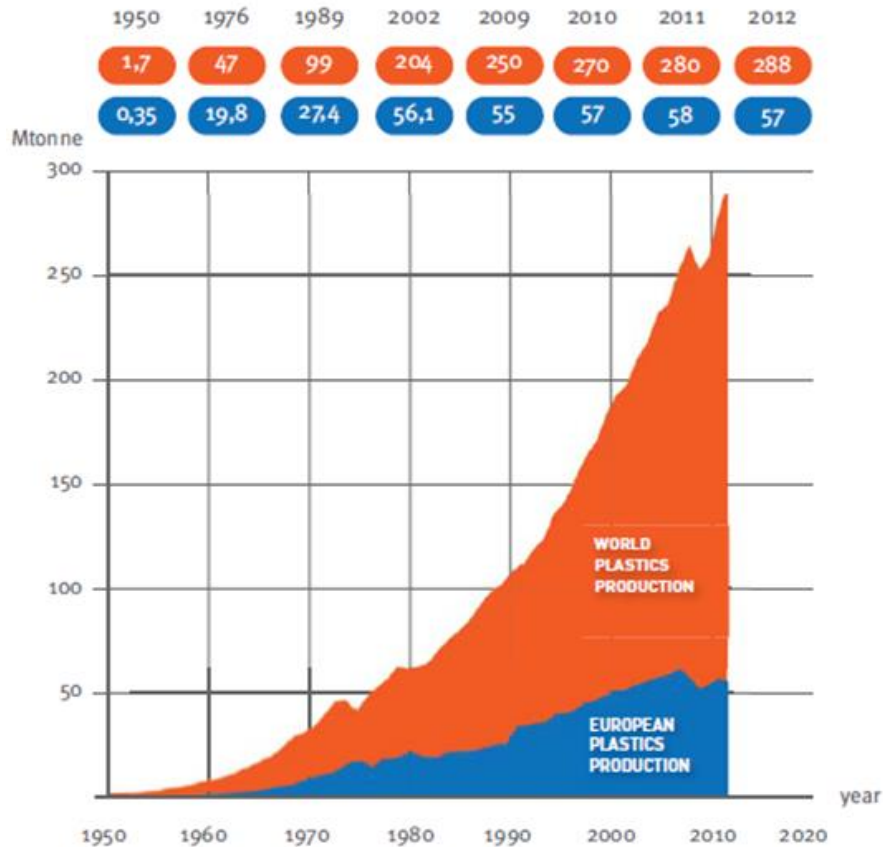


Figure 2: World plastics production 1950-2012
Includes thermoplastics, polyurethanes, thermosets, elastomers, adhesives, coatings and sealants and PP-fibers. Not included PET-, PA- and polyacryl-fibers
Source: PlasticsEurope (PEMRG) / Consultic



How did we get here?

Visible fate ... something happens!



Engage...

Concern for species
Concern for environment & humans
Likely multipliers of civic norm

Disenfranchise...

Not mine – not mine
“We are fine”

How did we get here?

Commonalities



Race ahead of ourselves

Optimise for speed and volume

Either you get there faster or you are lunch

Narrow focus = narrow set of options

Not just plastic, not just packaging

Understandable: last 100 years is a blink in history of humanity

Convergence

One problem?

Dozens of functions or services

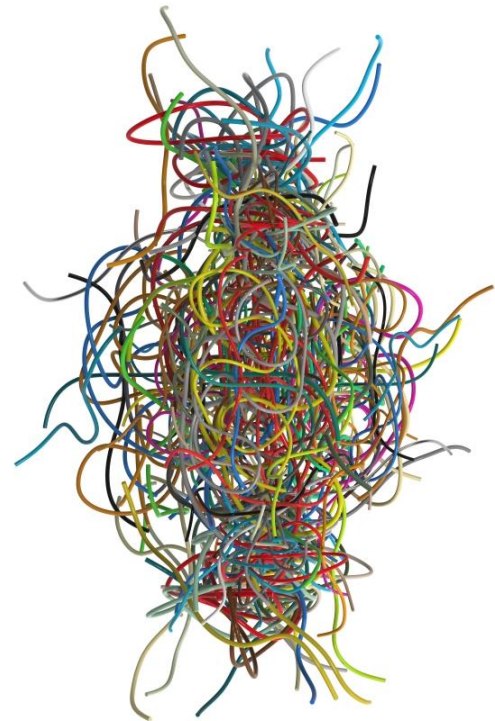
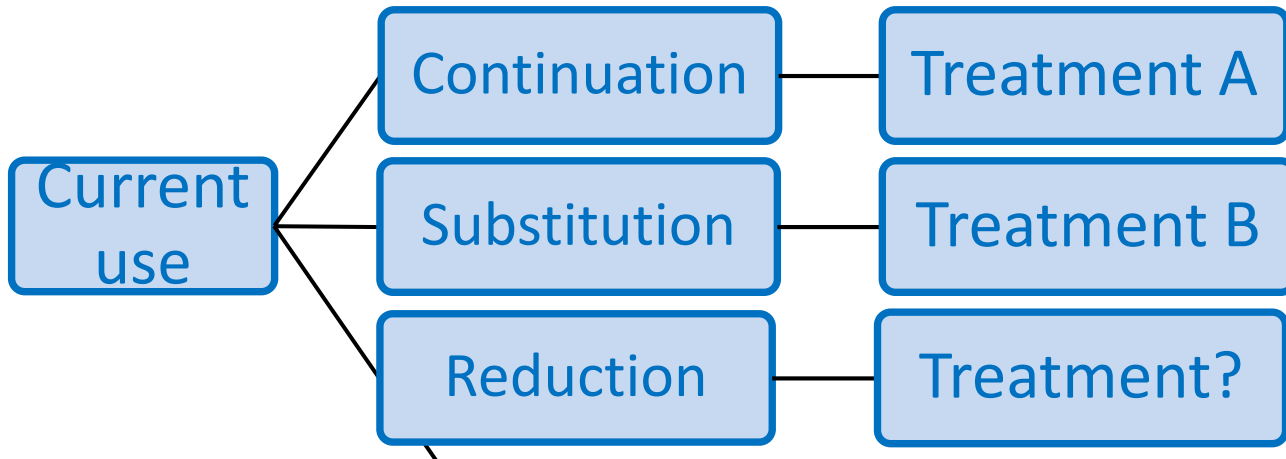
Dozens of products per function

1000s of products on the market

Formulations often unknown

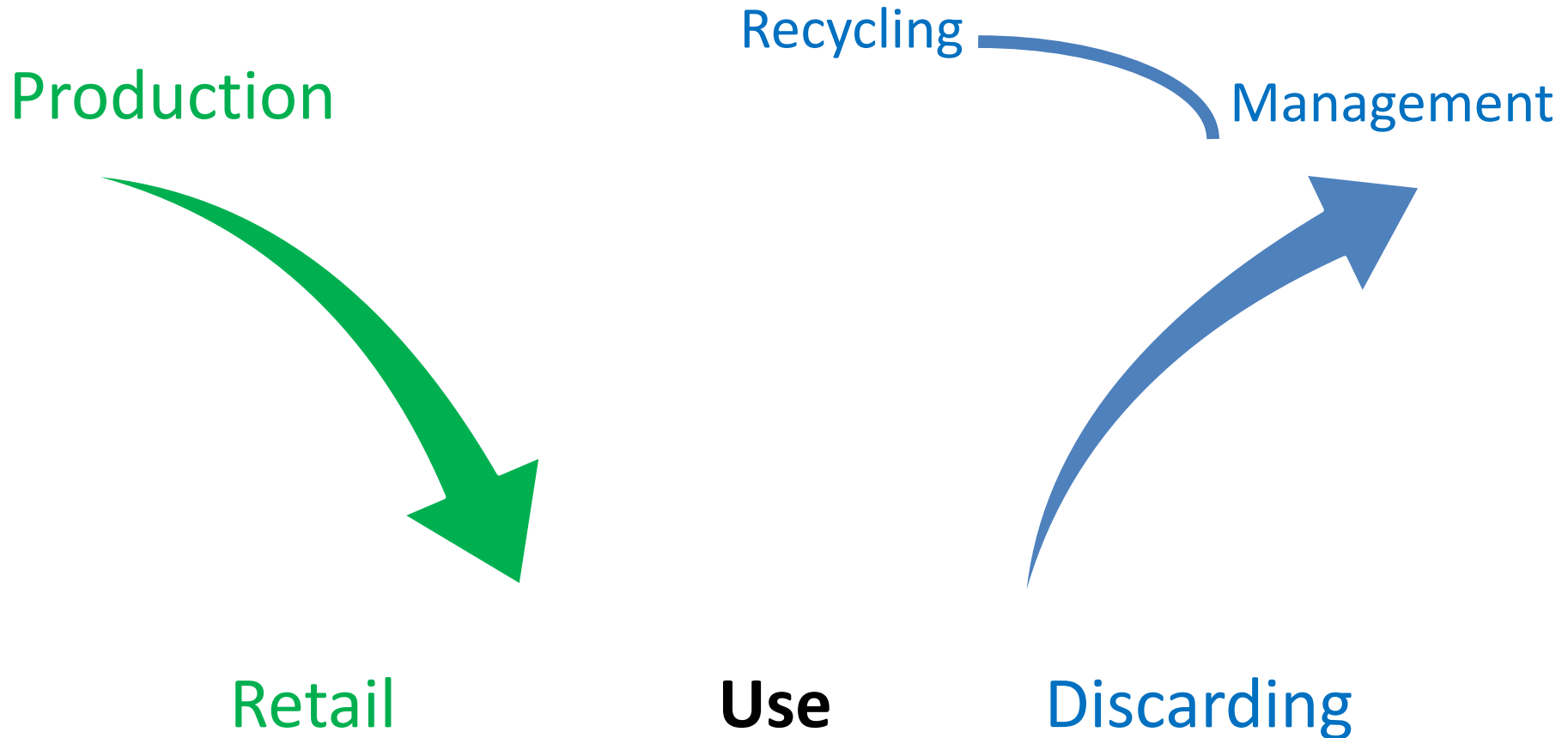
Convergence

One solution?



Convergence

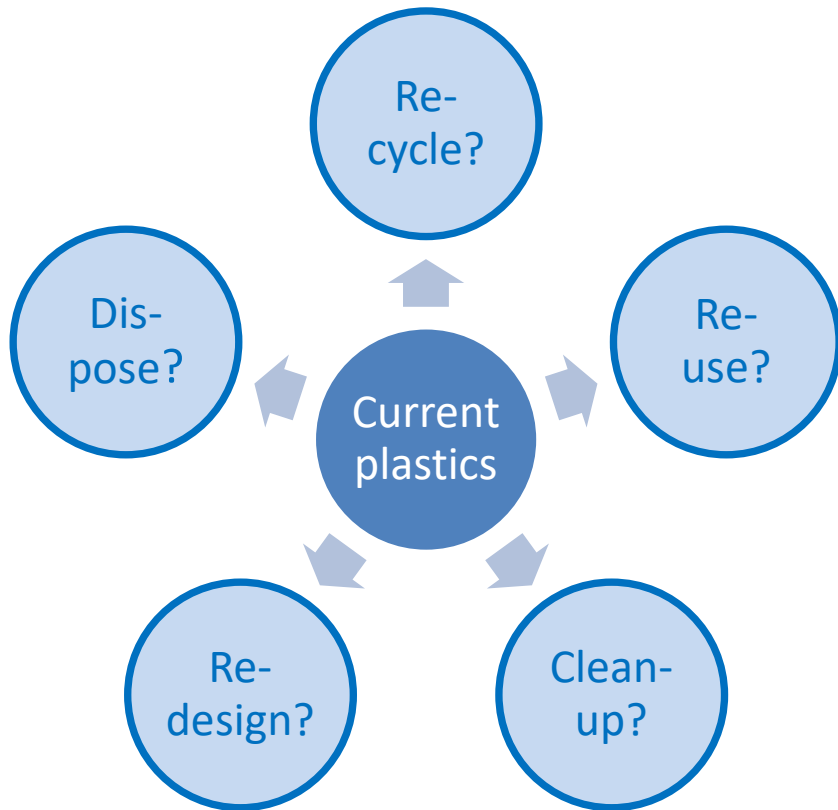
Shared difficulty?



➤ Take – make (hard to reuse) – use superficially – dispose

Convergence

Where do we go from here?



- How might we further link material to sustained value?
- How might we coordinate supply chain stages?
- How might we increase material recovery?
- What are the externalities of inaction?

Different perspective



Just a vehicle, e.g. photocopier,
online viewing - PSS

Positive note: already happening



Convergence on questions

Nothing happens until something happens; or
precautionary principle; or
proactive protection?

A	B	C				
✓	✓	?				
A	B		B	C	A	C
✓	✓		✓	?	✓	?
A	A		B	B	C	C
✓	✓		✓	✓	?	?

Parts of ecosystems affected

Not health-promoting

Value chain impacts are
exponential

$$3 \times 4 \times 5 = 100 \text{ vs } 2 \times 4 \times 5 = 40$$

Questions: Way forward

Within these constraints ...

- Non-monotonic dose-response
- Difficulties with mixtures
- Difficult experimental designs

We must find out...

- When is enough evidence 'enough' to work on prevention?
- Can we simplify abundance of substances?
- Can we revisit functions?

Thank you

“More important than technologies is the way they are embedded into social systems”

Dr Arturo Castillo Castillo

a.castillo@imperial.ac.uk

+44-20-7594 7312

Imperial College
London

Questions: Way forward

Burden of proof
& testing

Substances (IAS!)

Substitutes

Mixtures

In reaction with
fats, etc.

Barriers
to change

Technical lock-in

Regulation

Lacking novel
business models

Ways forward

Simplify Material &
Substance?

Revisit functions?

Can substitutes
reduce risk?

Single-point interventions



Degradable
where?

Infrastructure

Feedstock
provenance



Focus on End-of-
Life

Water column?

Disturbance



Dissipative

Overall efficiency?