

# *An overview of the current issues of waste across the food chain*

UCD Workshop

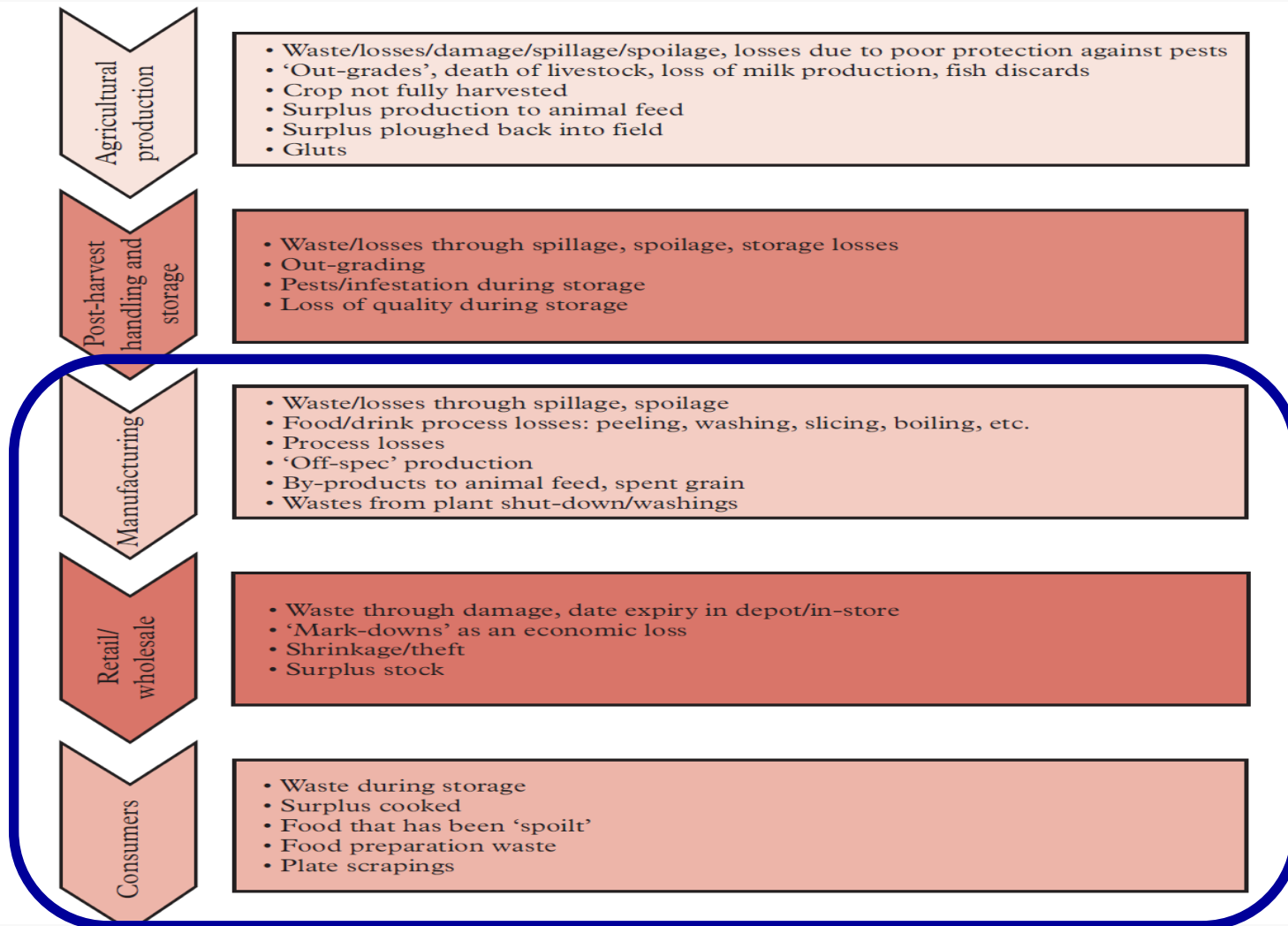
8<sup>th</sup> of June 2015

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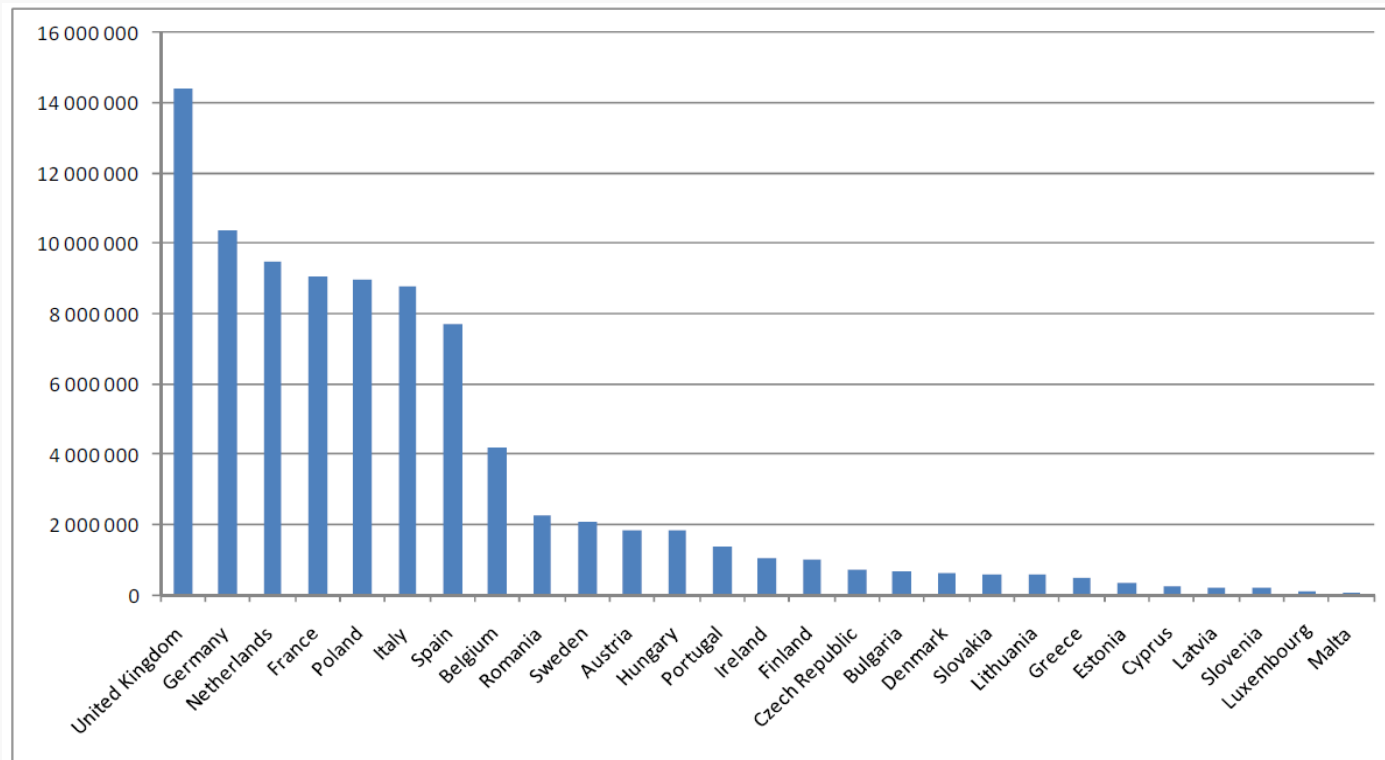
University of Reading

# Food waste throughout the supply chain



Counting the cost of food waste: EU food waste prevention, House of Lords, European Union Committee, 2014

# Total food waste in EU27



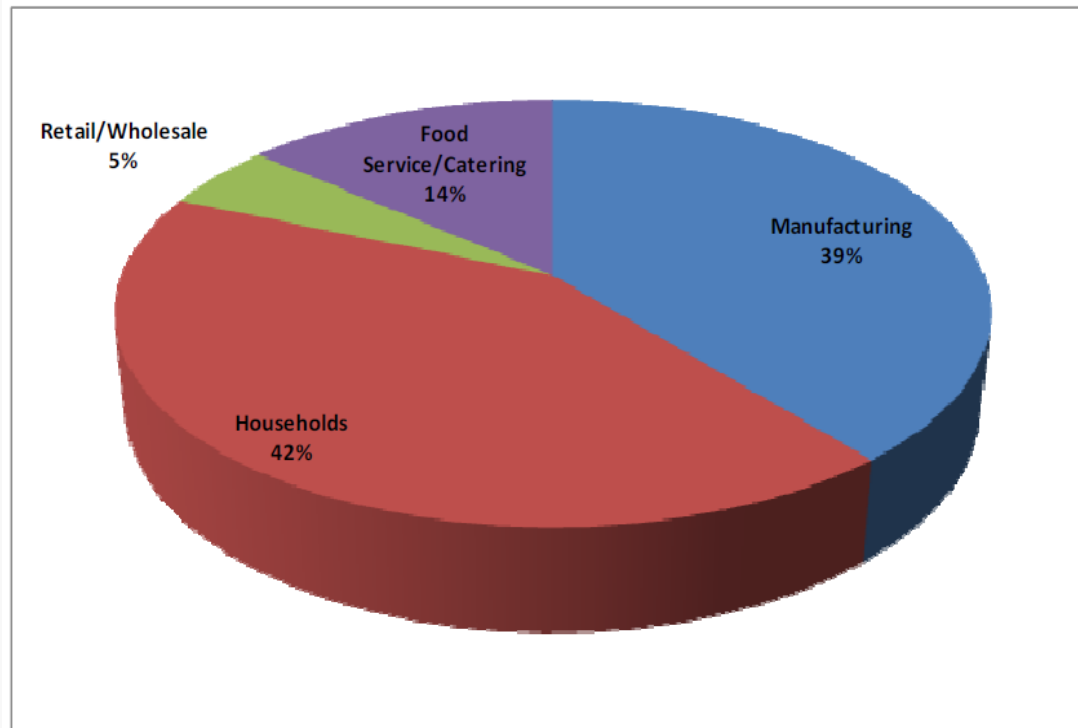
\*Excludes Agriculture, Hunting, Forestry

In 2006 ~ 89 Mt in EU 27

Predicted in 2020 ~126 Mt in EU 27

*Preparatory study on food waste across EU 27, European Commission, 2010*

# Percentage breakdown of EU 27 food waste



*Preparatory study on food waste across EU 27, European Commission, 2010*

# Environmental and economic impact of food waste

- The global carbon footprint of wasted food has been estimated to be more than twice the total GHG emissions of all road transportation in the US in 2010.
- In 2010 GHG emissions  $\sim 170$  Mt CO<sub>2</sub> eq./yr
- Predicted GHG emissions for 2020  $\sim 240$  Mt in 2020
- It is estimated that the cost of food wasted is around £900 - £1200/t

<sup>1</sup>Preparatory study on food waste across EU 27, European Commission, 2010

<sup>2</sup>Counting the cost of food waste: EU food waste prevention, House of Lords, European Union Committee, 2014

# Types of food processing waste

Vegetable trimmings, pulps,  
out of spec material



Starch based waste  
(segregated or mixed)

Fruit peels, pulps, out of  
spec material



# Types of food processing waste (continued)

## Meat and fish waste



## Spent grains, vegetable oilcakes



## Dairy waste



# Percentage of food wastes and by-products in different processes

Production process	% of wastes and by-products
Fish canning	30-65
Fish filleting, curing, salting and smoking	50-75
Crustaceans processing	50-60
Molluscs processing	20-50
Beef slaughtering	40-52
Pig slaughtering	35
Poultry slaughtering	31-38
Milk, butter and cream production	Negligible
Yoghurt production	2-6
Fresh, soft and cooked cheese production	85-90
White wine production	20-30
Red wine production	20-30
Fruit and vegetables juice production	30-50
Fruit and vegetables processing and preservation	5-30
Vegetable oil production	40-70
Corn starch production	41-43
Potato starch production	80
Wheat starch production	50
Sugar production from sugar beet	86

*AWARENET 2004, Agro-Food Wastes Minimisation and Reduction Network*

Food wastage footprint: Impacts on natural resources, FAO, 2013



# Main waste in UK grocery retail and manufacturing

Waste Stream	Grocery retail	Manufacturing	Total** (Mt)	%
Food waste	21,000	3,800,000	3.8	58
Packaging waste*	981,000	354,000	1.3	20
Food in Mixed waste	406,000	120,000	0.5	7
Packaging in Mixed waste	87,000	124,000	0.2	3
Other waste	-	492,000	0.5	7
Total (Mt)	1.5	4.9	6.3	

<sup>1</sup>Other waste: Foodstuffs into animal feed (e.g. bread, biscuits, confectionary)

In addition, ~ 1.5 Mt of food processing by-products that go into animal feed (molasses, sugar beet pulp, confectionary by-products, spent grains from distillery and brewery)

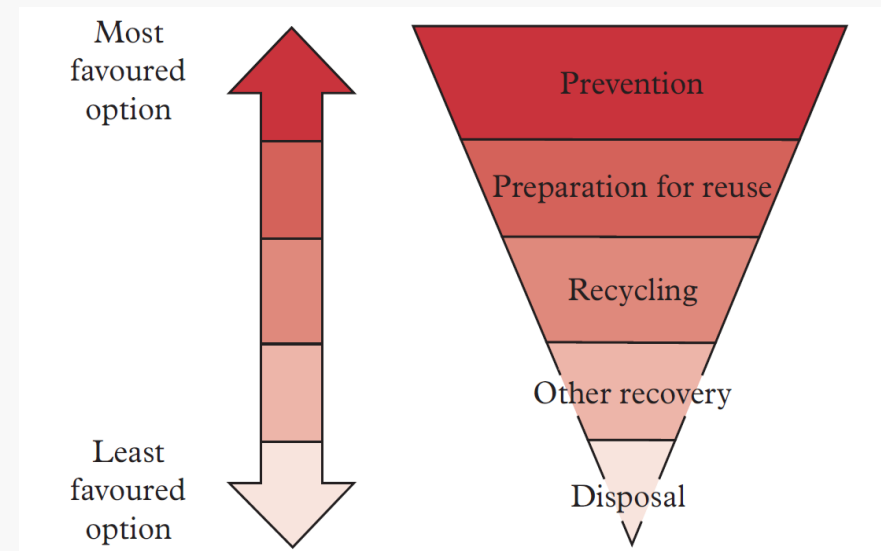
# Management routes for waste in UK grocery retail and manufacturing

Management	Grocery retailers <sup>3</sup>	Manufacturers	Total (Mt)
Landfill	-	45,000	0.04
Recycling <sup>1</sup>	-	1,300,000	1.3
Thermal	-	400,000	0.4
AD <sup>2</sup>	19,000	-	0.02
Land spreading	-	2,000,000	2.0
Unknown	401,500	181,000	0.6
Total m/t	0.4 <sup>4</sup>	3.9	4.3

*WRAP Report, 2013 'Estimates of waste in food and drink supply chain'*

# Waste management practices and EU policies

- Number of EU policies to tackle food waste (e.g. Waste Framework Directive, Landfill Directive)
- Targets set (recycling, landfill)
- Expected reduction of the amount of food waste sent to landfill from ~ 40 Mt to ~4 Mt by 2020



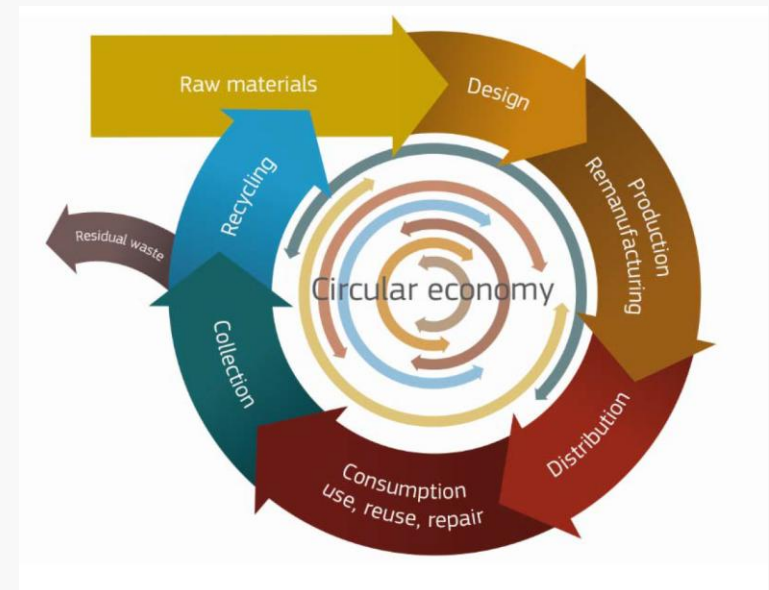
*Preparatory study on food waste across EU 27, European Commission, 2010*

# Towards a circular economy

‘Design out’ waste involving innovation throughout the value chain (will be implemented by end 2015)

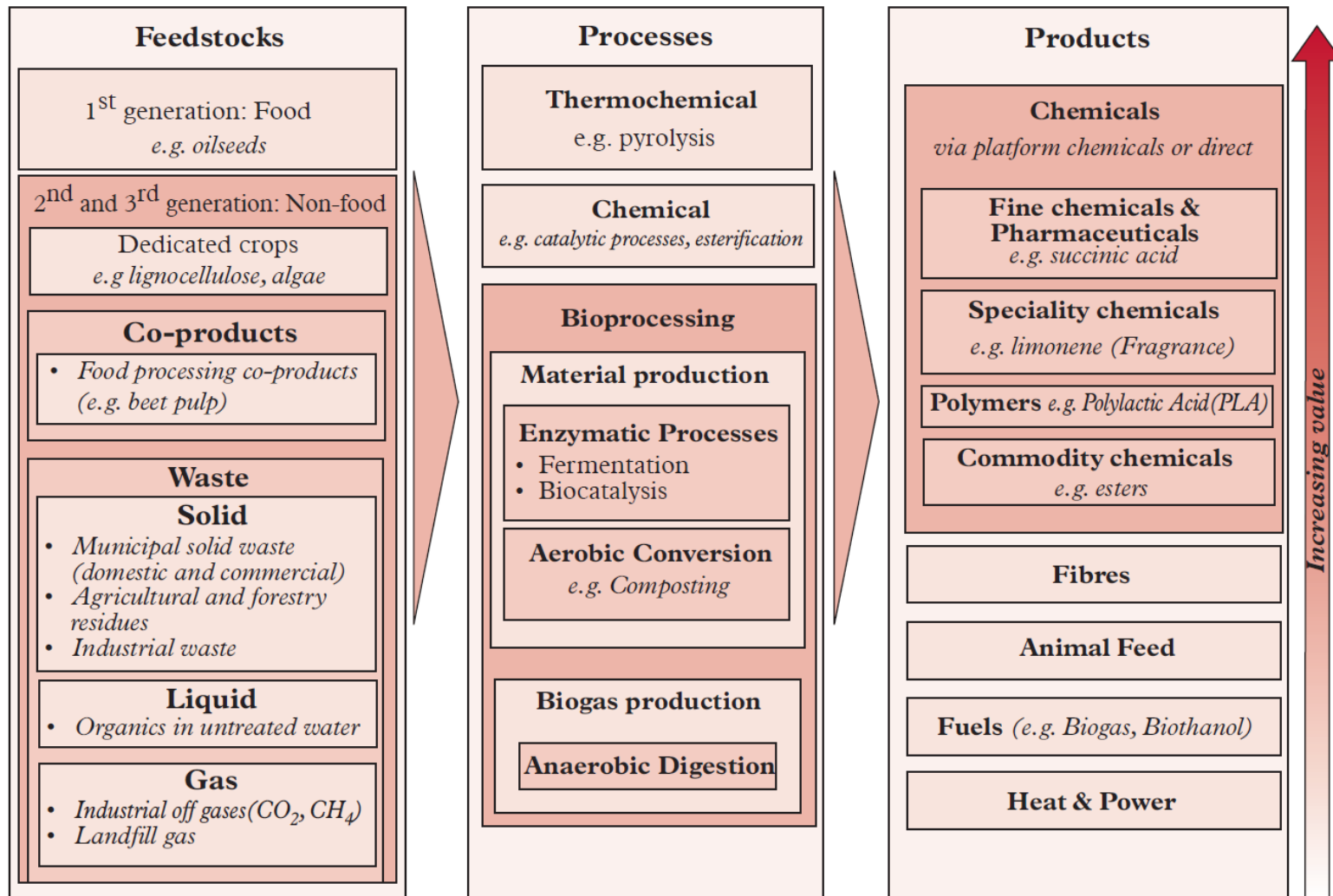
## Targets by 2030

- Reduce material input by 17-24 %
- Saving potential €630 bn
- Reduce total GHG emissions



*Towards a circular economy: A zero waste programme for Europe, European Commission, 2014*

# Food waste and by-products as a resource – The biorefinery concept



Waste or resource? Stimulating a bioeconomy, House of Lords, 2014

# Potential products

## Bioactive compounds



## Flavours



## Biopolymers



## Biofuels



## Natural colours

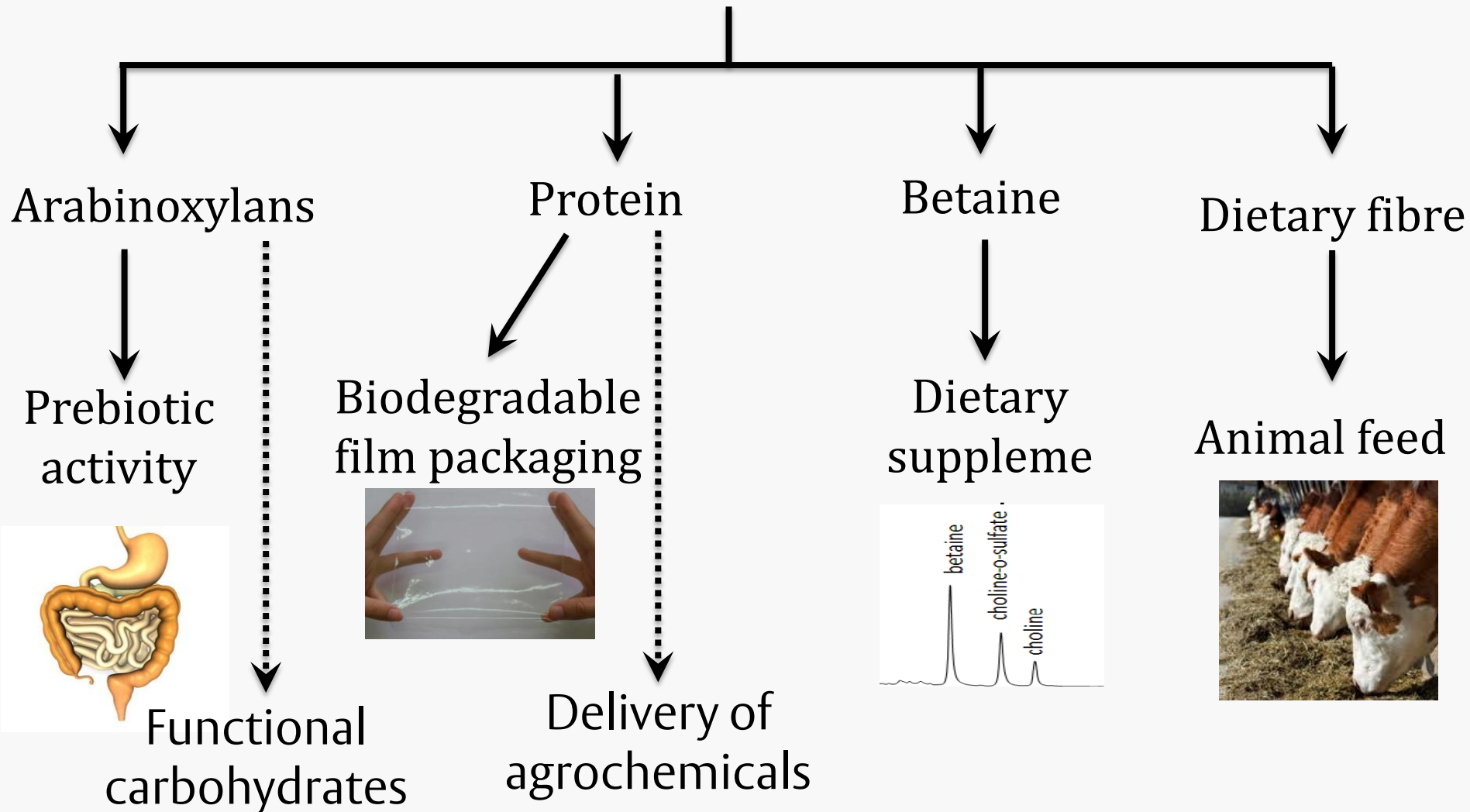


## Chemicals



# Example: Valorisation of DDGS

## DDGS



# Business challenges

- Raw materials availability (volumes, seasonality)
- Logistics
- Market potential of products (volumes, value)
- Investment – Reducing risk
- Business models
- Economic and environmental impact



## R & D challenges

- Detailed compositional data of food waste materials
- Implementation of green processing technologies
- Integration of processing with IB technologies (enzymes, microbes)
- Process scalability & process economics
- Functionalisation of molecules to suit market applications

# Research Network



## Food Processing Waste and By-products Network (FoodWasteNet)

[www.foodwastenet.org](http://www.foodwastenet.org)

