



Sutton Bonington, 28<sup>th</sup> Nov 2017

# **Food Waste : Opportunities and challenges**

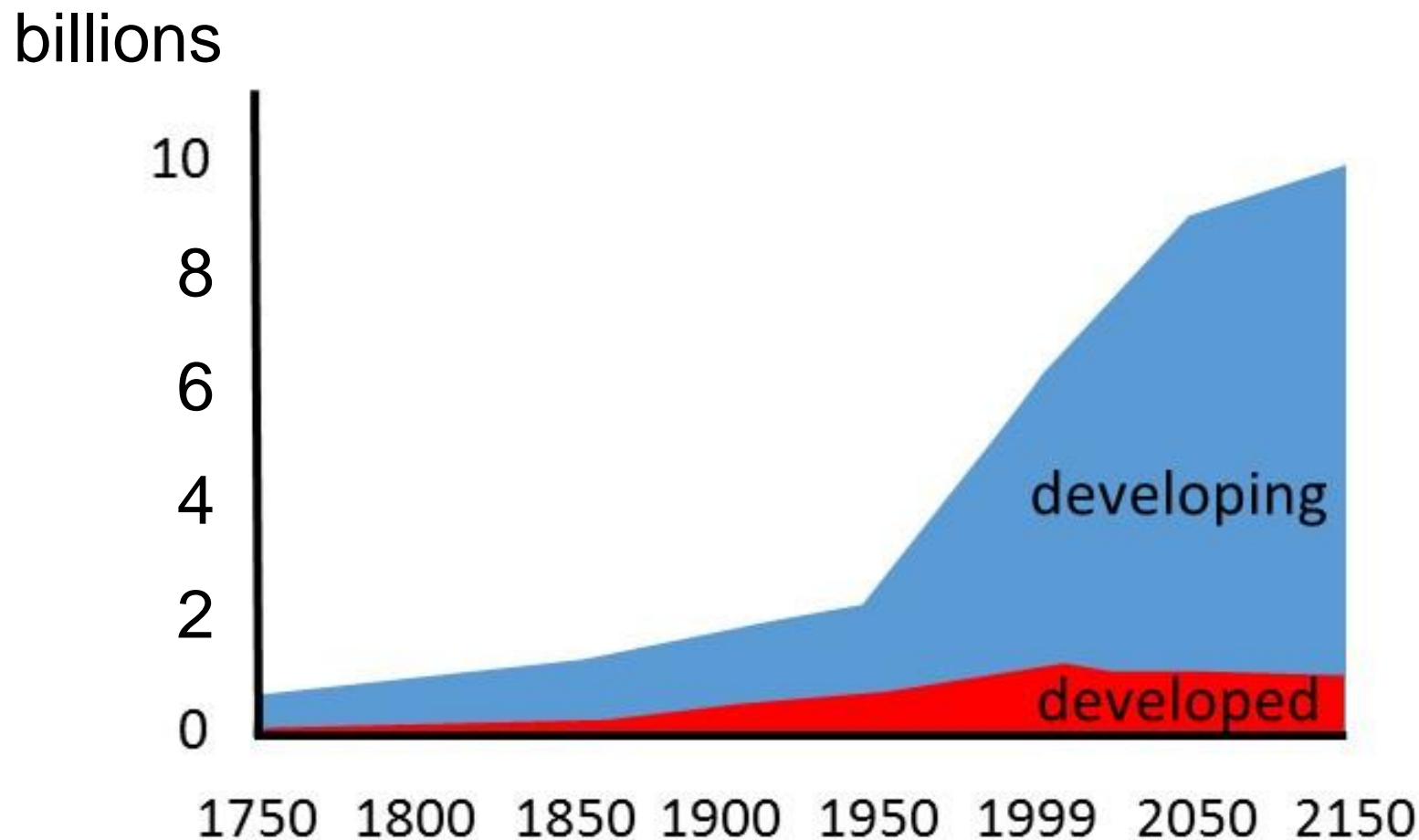
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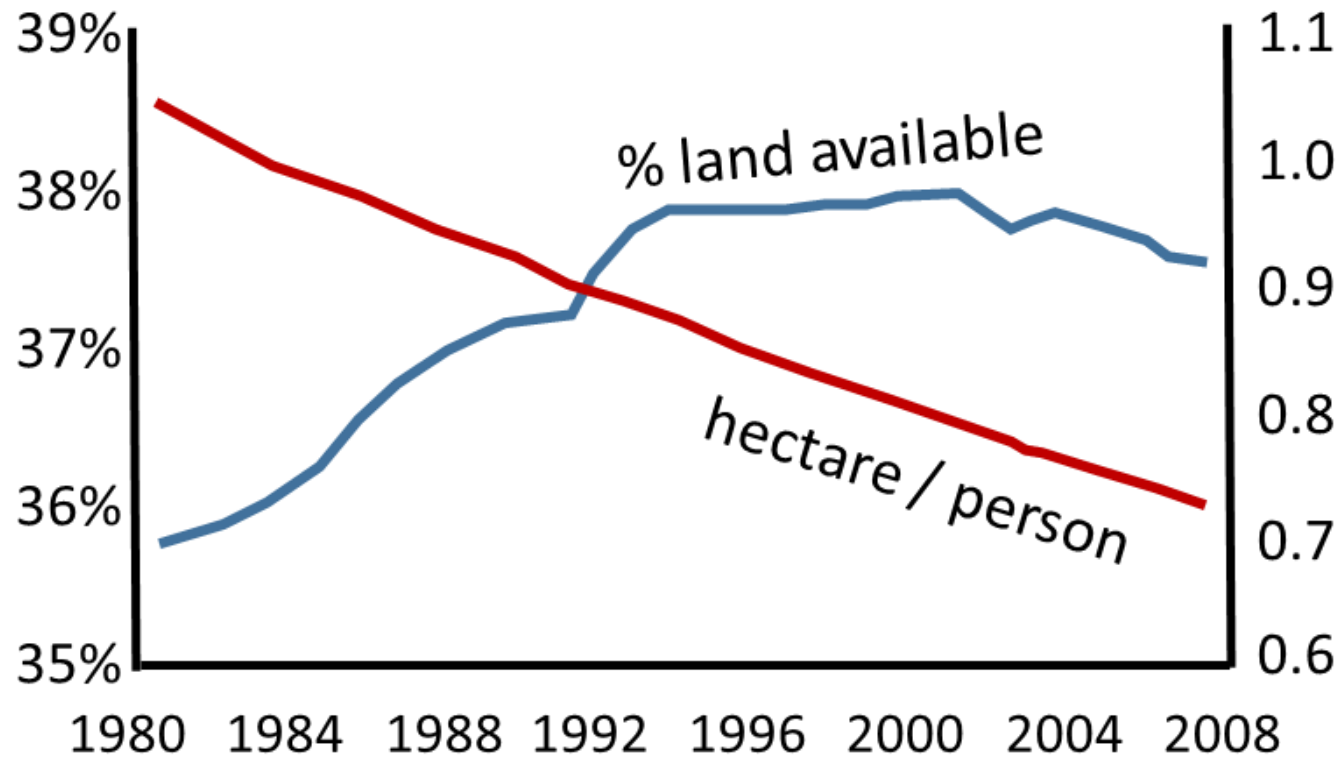
- **The Big Picture**
- **Definitions – agri-food co-streams**
- **The business landscape**
- **Motivations and barriers**
- **Risks and mitigation**



# The big picture : projection of global population



# global land in agricultural use



FAO report 2015

- 5% expansion possible by 2050 ?
- Can we continue to feed everyone ?

# Can we keep up with demand ?

**Produce more (sustainably)**



**Change consumption habits**



**Waste less**





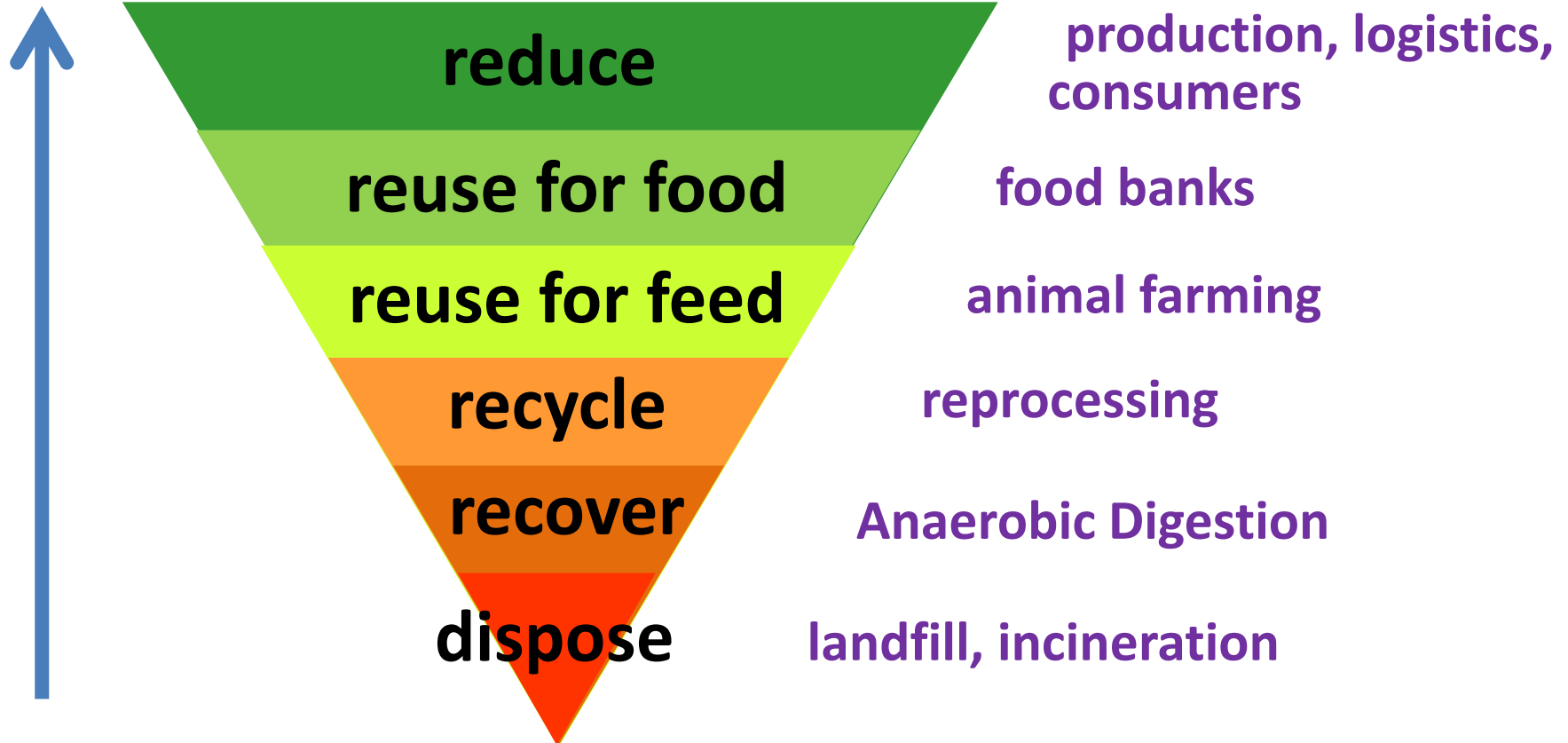
# Where does food waste occur in the UK ?



# Priorities from the waste hierarchy

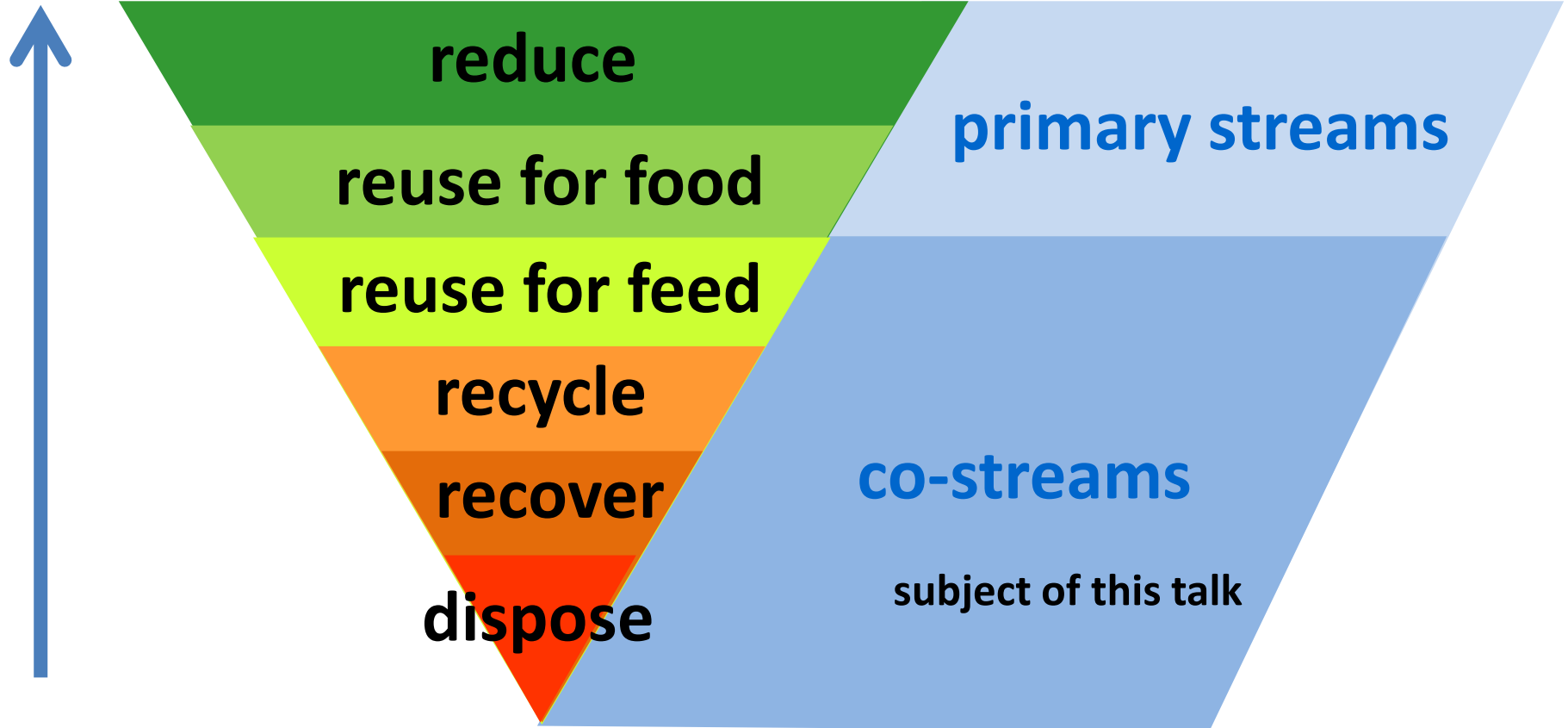
- comes from EU Waste Framework Directive

social/environmental  
priority



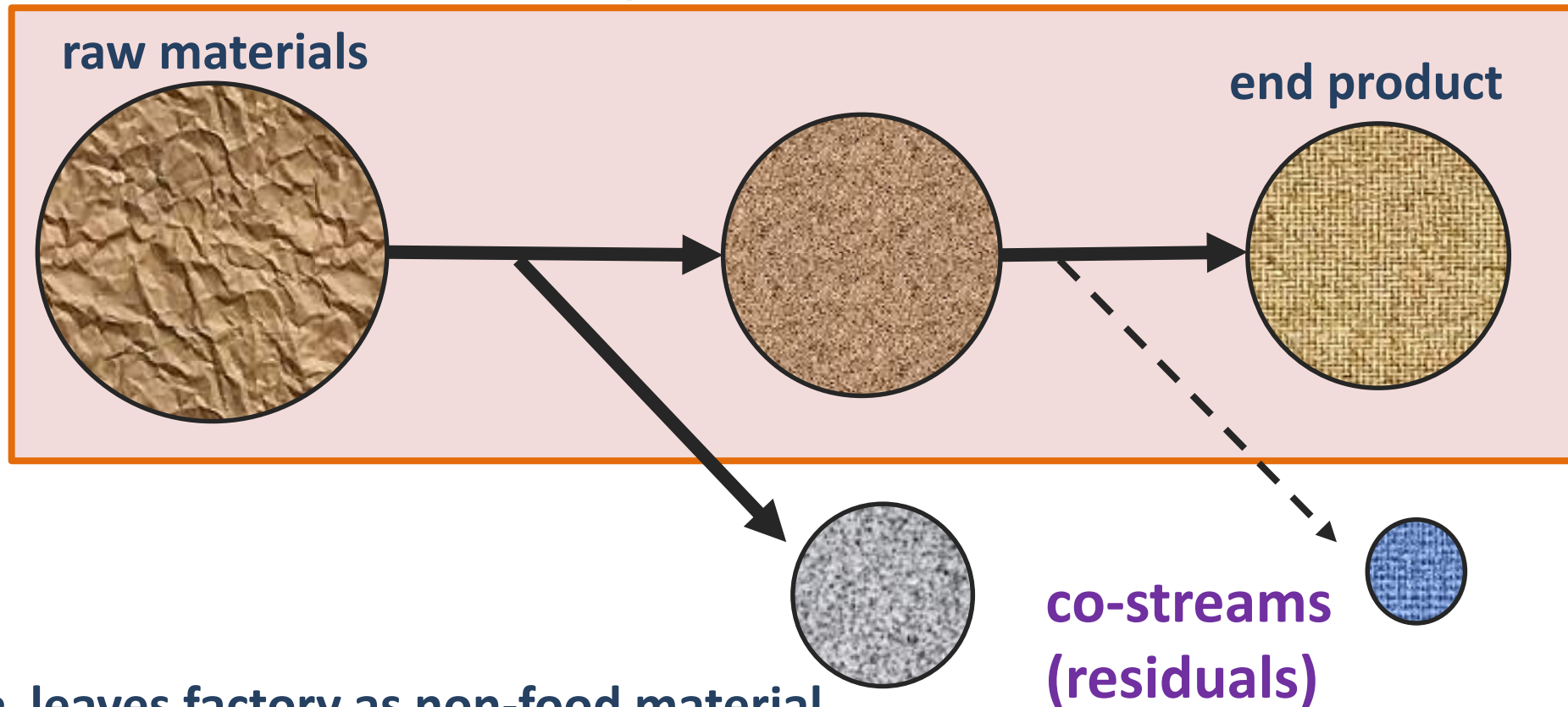
# Food production and the waste hierarchy

social/environmental  
priority



# Defining food process co-streams (residues)

food grade environment



- leaves factory as non-food material
- can be major or minor streams
- can be regular or intermittent
- low stability - fresh, wet, biologically active



# Examples of food process co-streams



**leaf and stem**



**cutting and peel**



**liquor / solid  
residues**



**out-of-spec**



**reject production**





# The Challenge !



- nutritional value
- economic value

- return to the food supply
- return to other value use

# Why make the effort ?

Will it help the business ?

What investment will be needed?

What is the risk?

What benefits are there ?

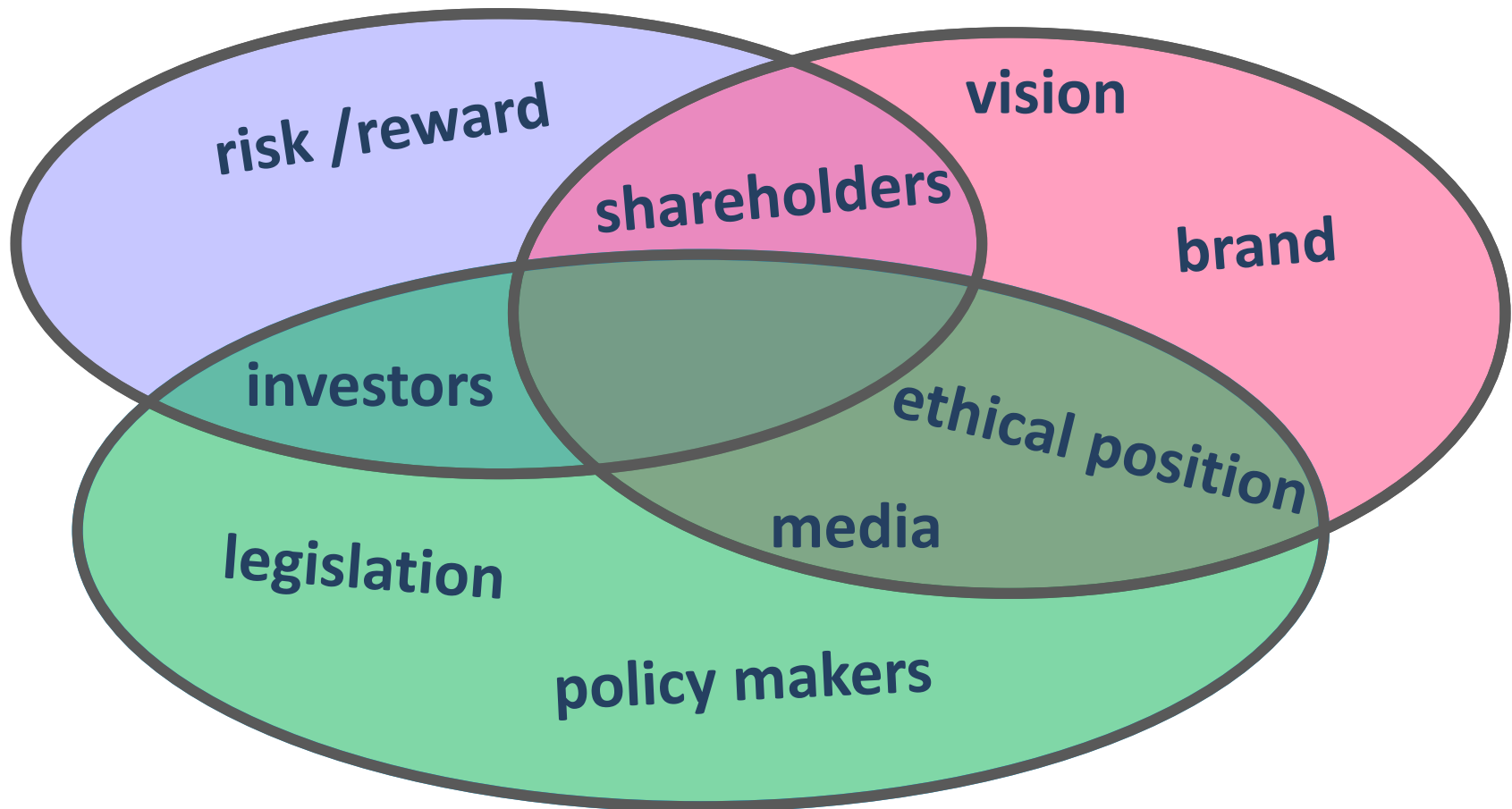


**“What was the decision making process that led to hiring a cat?”**

# Influences within the business landscape

**financial**

**corporate**



**environmental and social**



# What motivations ?





# Investment contributes to the bottom line



- **Direct profit or saving**
- **Market impact**

# Initiatives align with the corporate ethical vision



- ingredients from food co-products
- sustainability platform
- green credentials
- natural products

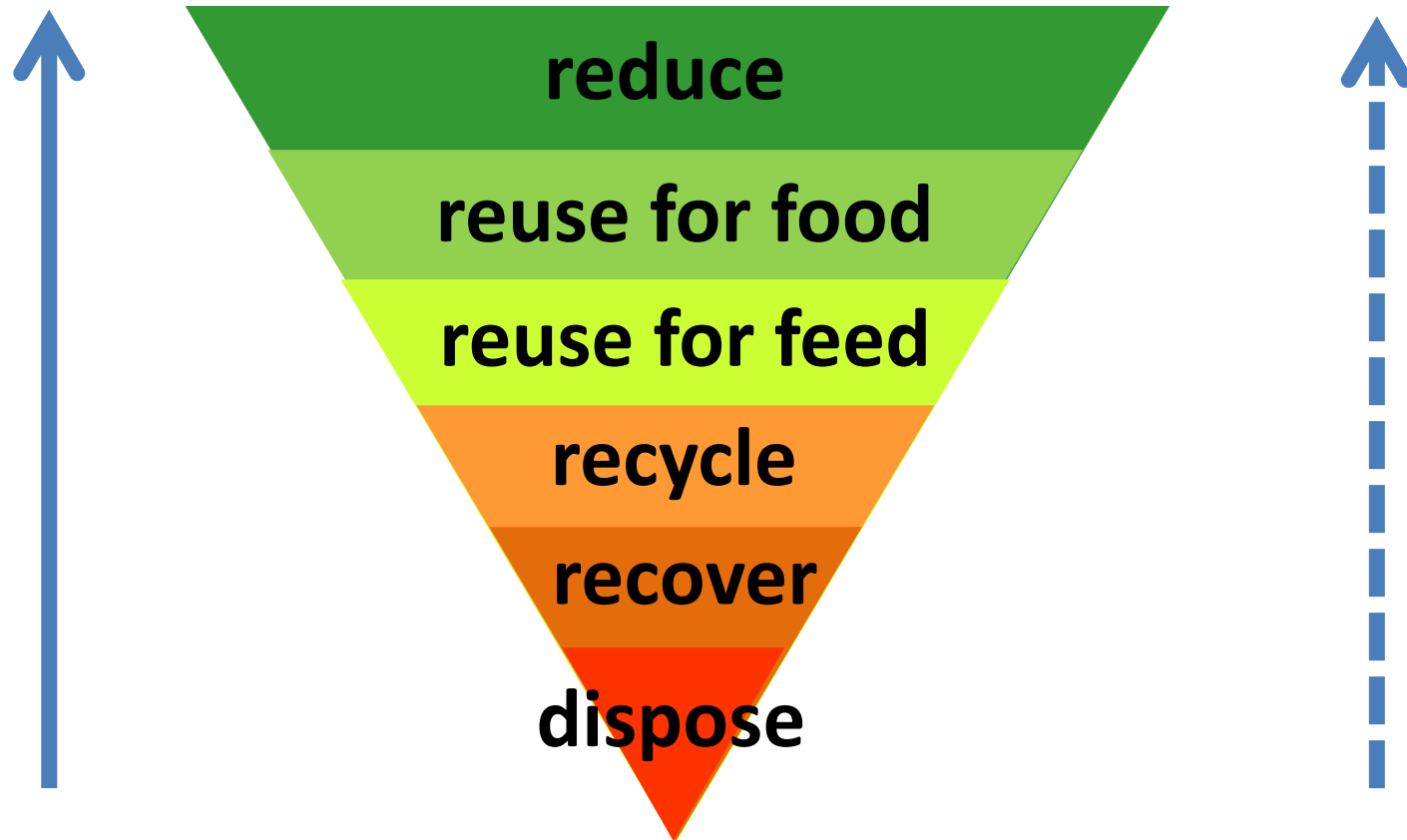


# Investment aligns with Government policy

- EU Waste Framework Directive

social/environmental  
priority ?

commercial priority ?





# Response to legislation

## Promoting recycling

target 50% household recycling by 2020

target 75% of packaging by 2020

landfill tax rising to £80/t

(definitions for sorting, recovery and reuse)

## Reducing Food Waste

target 75% reduction in biodegradable  
landfill waste by 2020

credits for Anaerobic Digestion

proposed 50% reduction in food-waste by 2030\*

need for “effective use of unavoidable food waste” #



\*EU Landfill Directive update 2015

#EU Circular Economy package 2015

# Response to media influences

## The 'Wonky' vegetable story !



Hugh Fearnley-Whittingstall rejects Morrisons' 'pathetic' wonky veg trial

theguardian  
Nov 2015



Tesco is selling 'wonky veg' for up to half price in bid to curb food waste

THE  INDEPENDENT  
March 2016





# What are the Barriers ?



# Uncertainties along the development pathway



**Market**

*who will buy product ?*



**Production**

*who will produce ?*



**Process**

*how to produce ?*



**Applications**

*what uses ?*

**Characterisation**

*what's in it ?*

# Risk as a barrier to commercial investment

**Investment risk =**

**uncertainty (price/market/technical)**

**x investment cost**



- unit production cost (€/kg) < unit selling price ?
- high investment cost = high volume or high price ?



# Risk as a barrier to commercial investment



# Market development risk follows technology development risk

out-of-spec potatoes



sorting



effluent-AD



processing



extraction



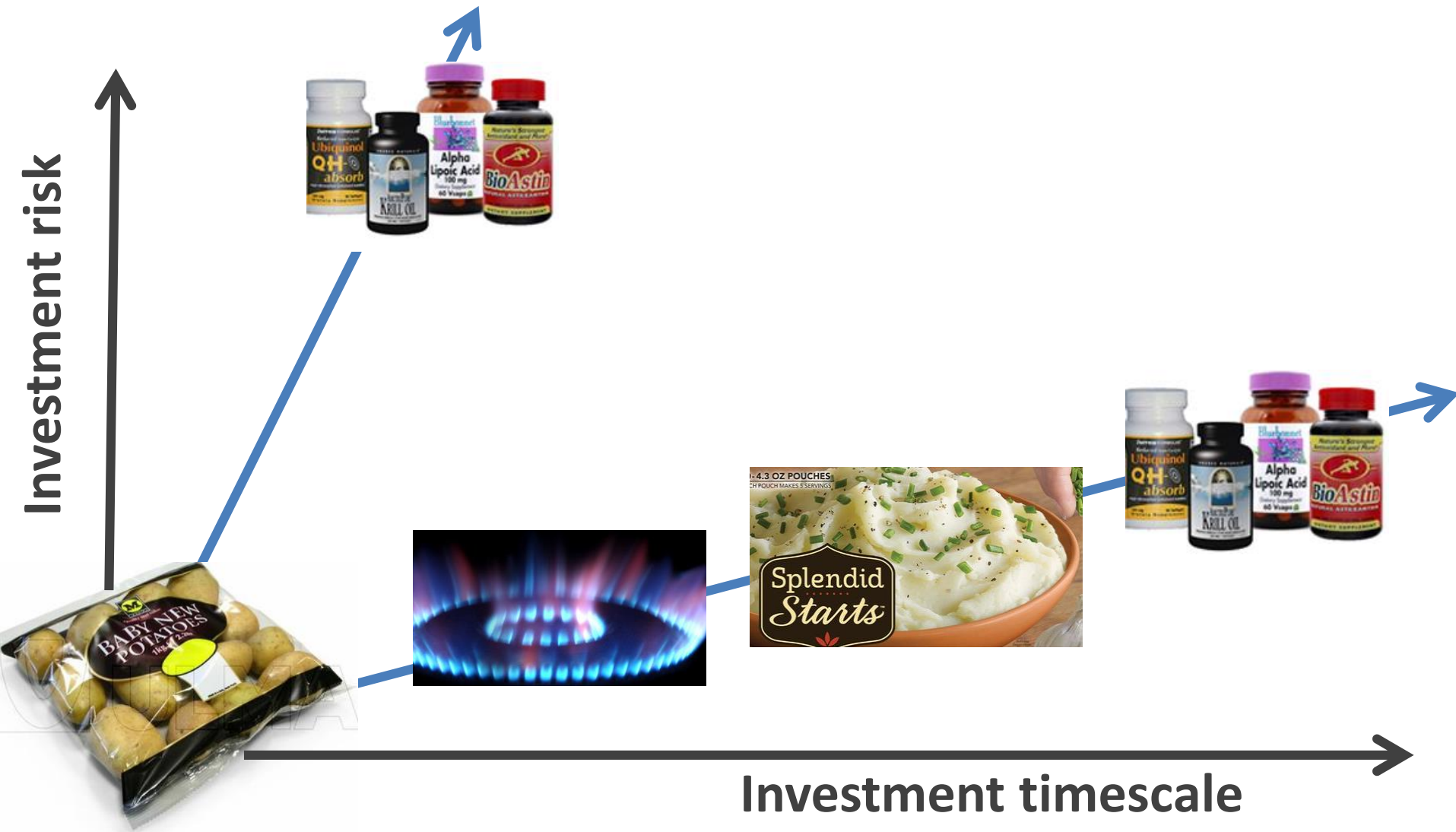


# Mitigating the risks



# Making step-wise developments

- risk increases with distance from core business activities
- incremental advance of knowhow, confidence and strategy



# Utilising established technology and knowhow

## waste onion peel : oil extraction

supercritical fluid  
extraction



steam distillation



- used by others already
- established technology providers
- fit with existing factory operations



# Partnerships for development

## Functional Rubisco protein from green co-streams



Food ingredients



EU BBI - JU



# Fitting into a supply chain

## valorising blackcurrant pomace



health

new business

new business

dry pomace

drying

anthocyanins

extraction

Anti-oxidants:  
pharmaceuticals  
nutraceuticals

juice company

wet pomace



# Opportunities for entrepreneurship and creativity !



- motivations may be financial or ethical or in-between
- do the easier things first – harder things later
- manage risk by seeking help and partnerships