#PostharvestAncona2024

Drivers of food loss and waste & the importance of quantification

Dr Natalia Falagán

Senior Lecturer in Food Science and Technology

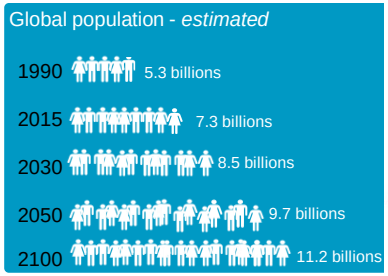
24th January 2024

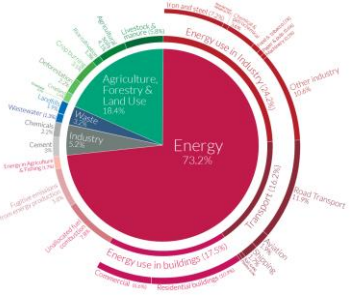
www.cranfield.ac.uk

Content

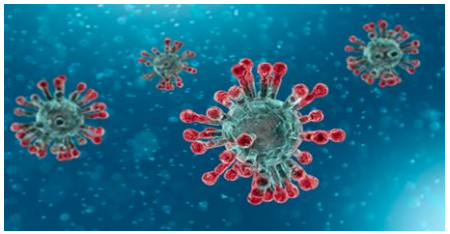
1. Context
2. Food loss and waste drivers
3. UK: case study
4. A call for collaboration

Context





Limited food production



Supply chain disruption

Sustainability, resilience, and accessibility

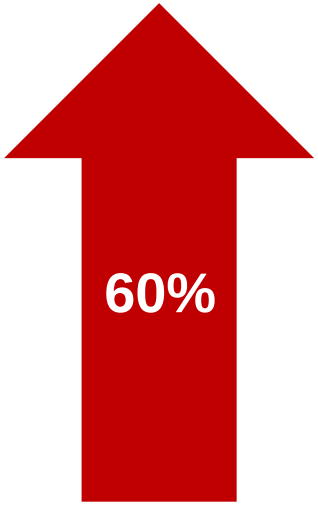
Sources: United Nations Department of Economic and Social Affairs, OurWorldinData.org, IIR

Context

2005 **2050**

Source: Food and Agriculture Organization of the United Nations

Context



Burden for the food production system

- Soil degradation
- Reduction of water availability
- Greenhouse gas emission increase

‘***Food saved is as good as food produced***’

Context

Increasing food demand

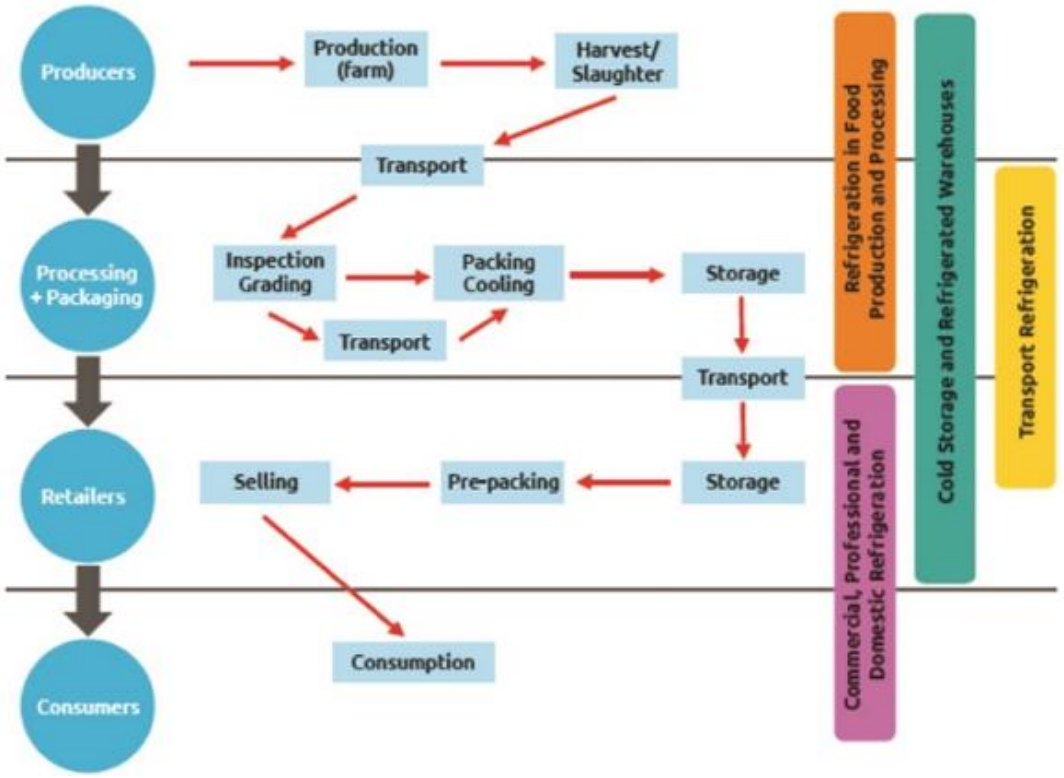
High food loss and waste

Changes in energy supply

Competing for resources (land, water, energy, human capital/skills)

Context

- Food chains are complex
- Need to maintain food at the correct conditions from harvest, production, distribution, sales and consumption
- Both static and mobile elements, which have to work seamlessly together



Context

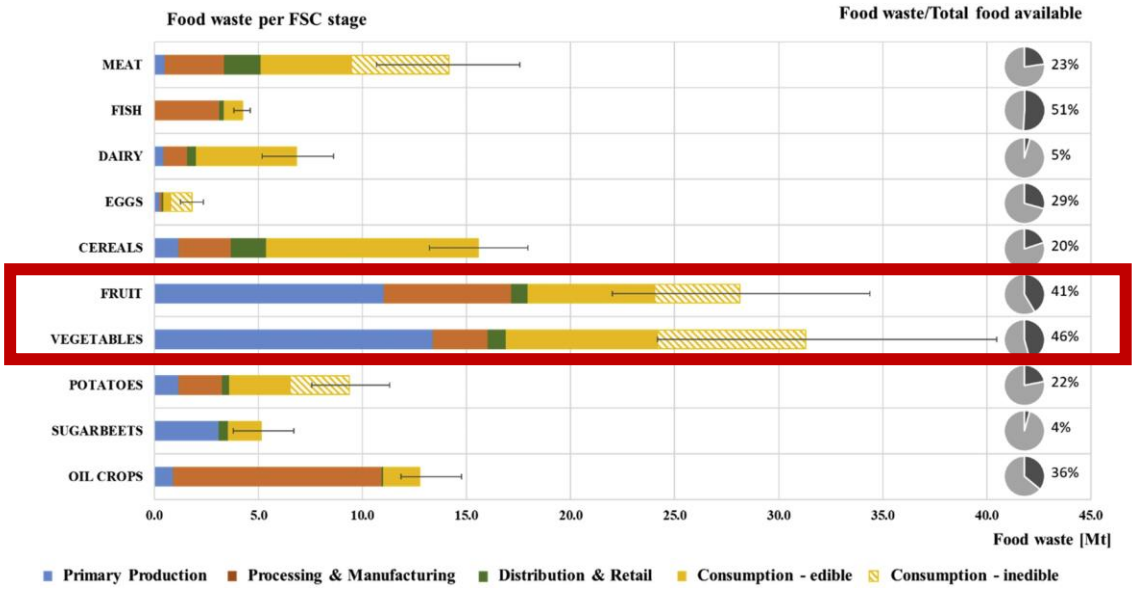
Raising temperatures

Food production

Storability potential

Food loss and waste

Global food security



UK as case study

As a result of these challenges, current food loss and waste evidence is highly polarised between

i) high level quantification lacking detail as to relevant food loss and waste drivers;
ii) highly focused but fragmented analysis that is not representative of the wider supply chain.

To address this deficiency → critical metanalysis of evidence with newly synthesised data relating to drivers in the UK supply chain to guide mitigation actions

HOW MUCH? **WHERE?** **WHY?**

UK as case study

Food loss

Food loss refers to the decrease in edible food mass at the production, postharvest and processing stages of the food chain, mostly in low-income countries.

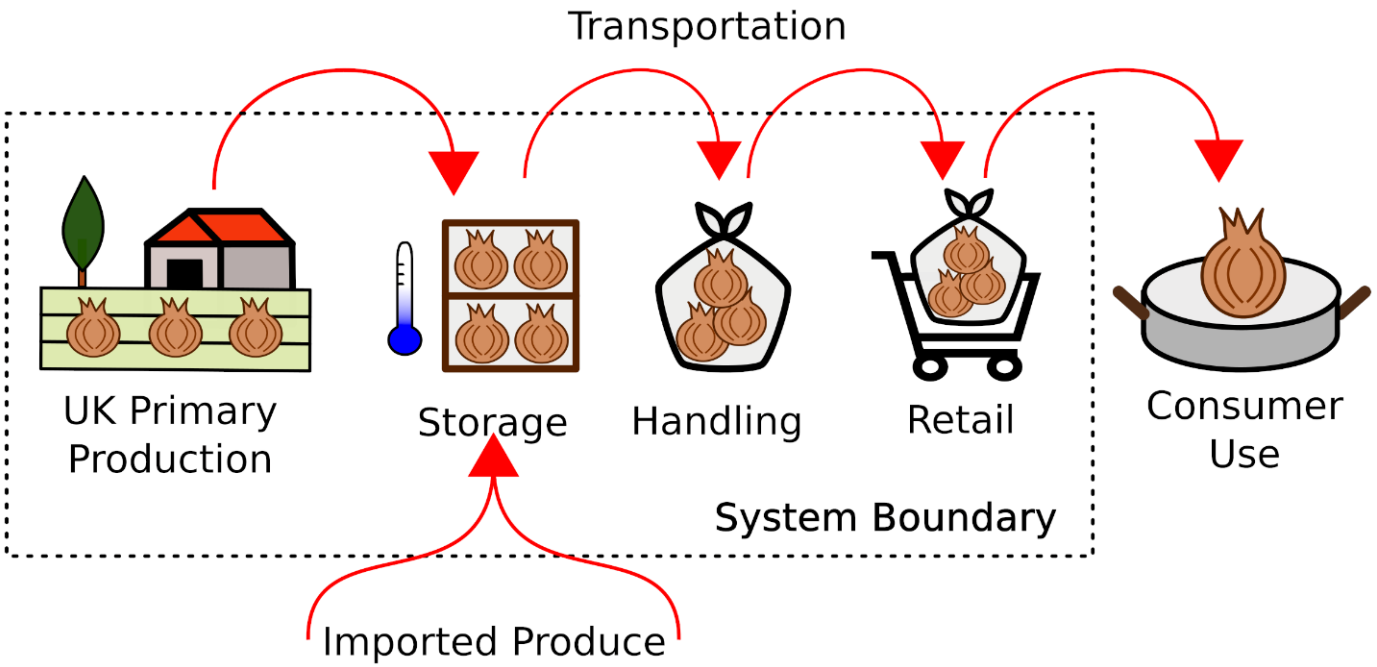
Food waste

Food waste refers to the discard of edible foods at the retail and consumer levels, mostly in developed countries.

Source: Food and Agriculture Organization of the United Nations

UK as case study

STEP 1



STEP 2

Model crops selected: potato, apple, carrot, tomato, onion, cucumber, lettuce, sweet pepper, strawberry, pear, broccoli/cauliflower, cabbage, and raspberry; as these represent the **greatest volume demand and value for UK consumers**

UK as case study

STEP 3 Systematic literature review to identify current values for food loss and waste in the UK

Timeframe: 2010 – 2023

Boundary: only conventional production systems

Stages: harvest losses; storage; handling (including packing and local transport); and retail.

STEP 4 Stakeholder survey

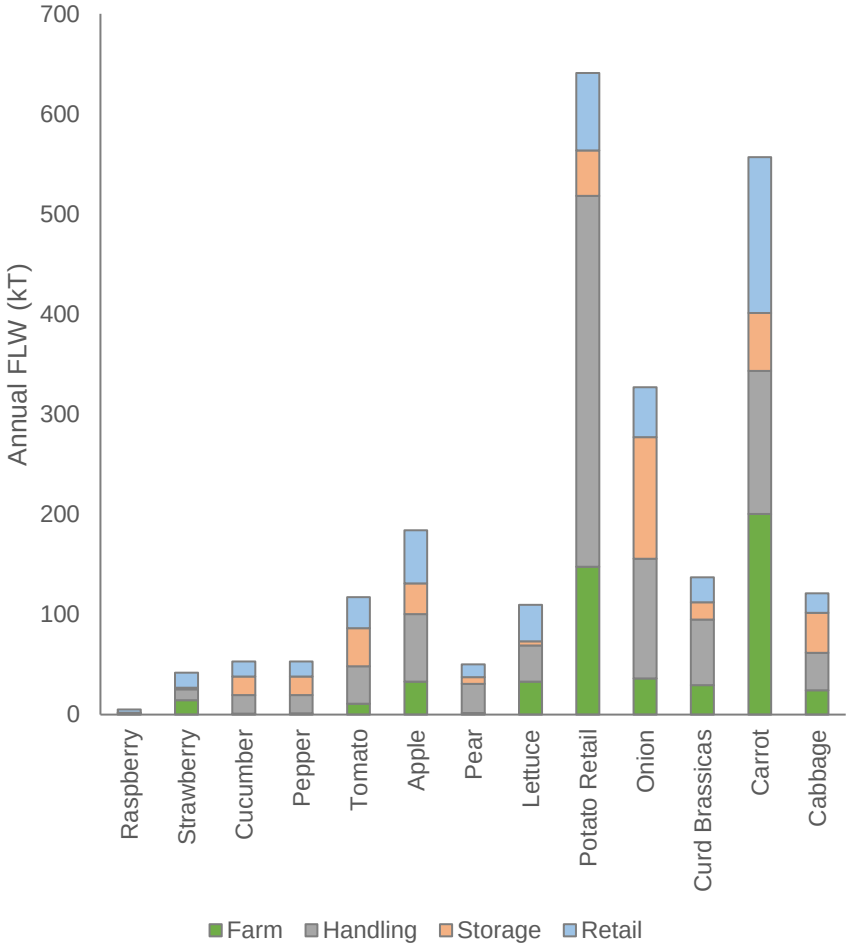
Obtain primary data.

Describe views on food loss and waste and link with core themes seen in literature review.

Validate secondary data and test assumptions for drivers.

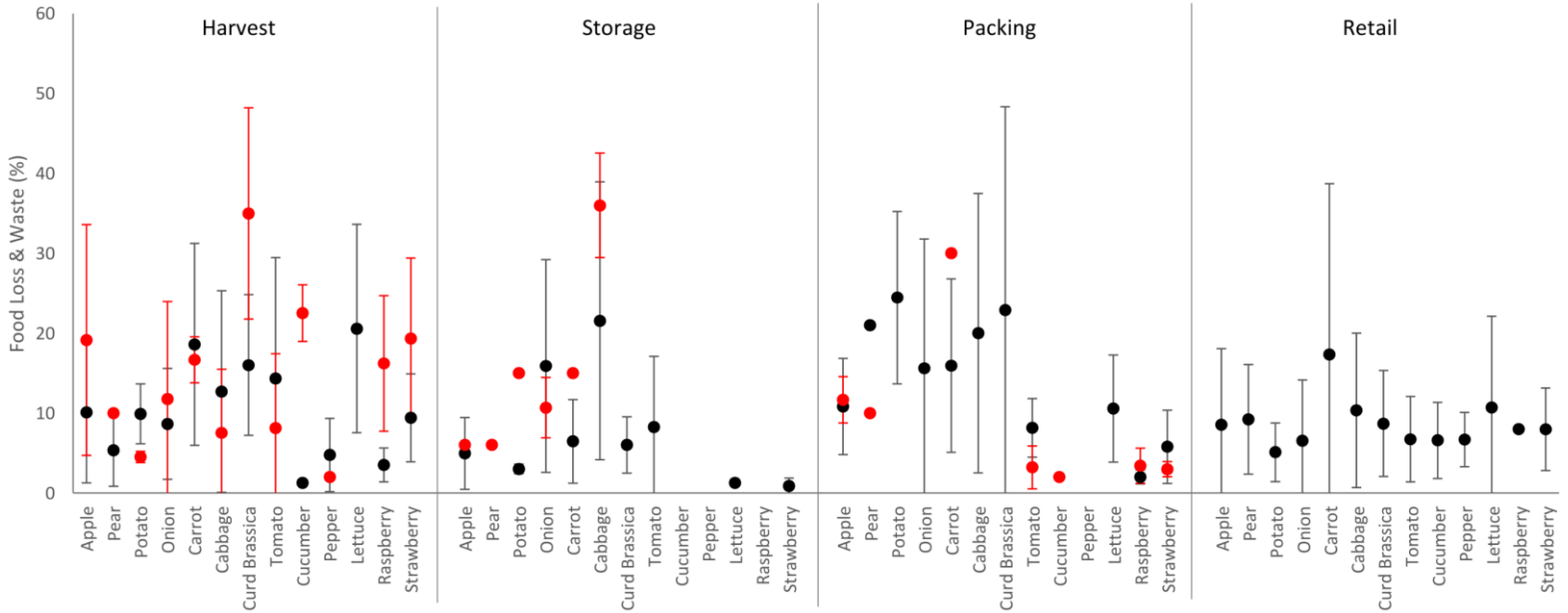
UK as case study

- Our results show that 2.3 Mt (35.2% of total supply) of food loss and waste is generated annually from UK grown and imported produce.
- Apple, onion, carrot and potato are key contributors (58%) due to high quality requirements but limited ability to control growing conditions because of low market value.
- Short supply chains prevent significant postharvest losses outside of long-term storage crops.
- Retail food waste dominated by supply/demand issues.

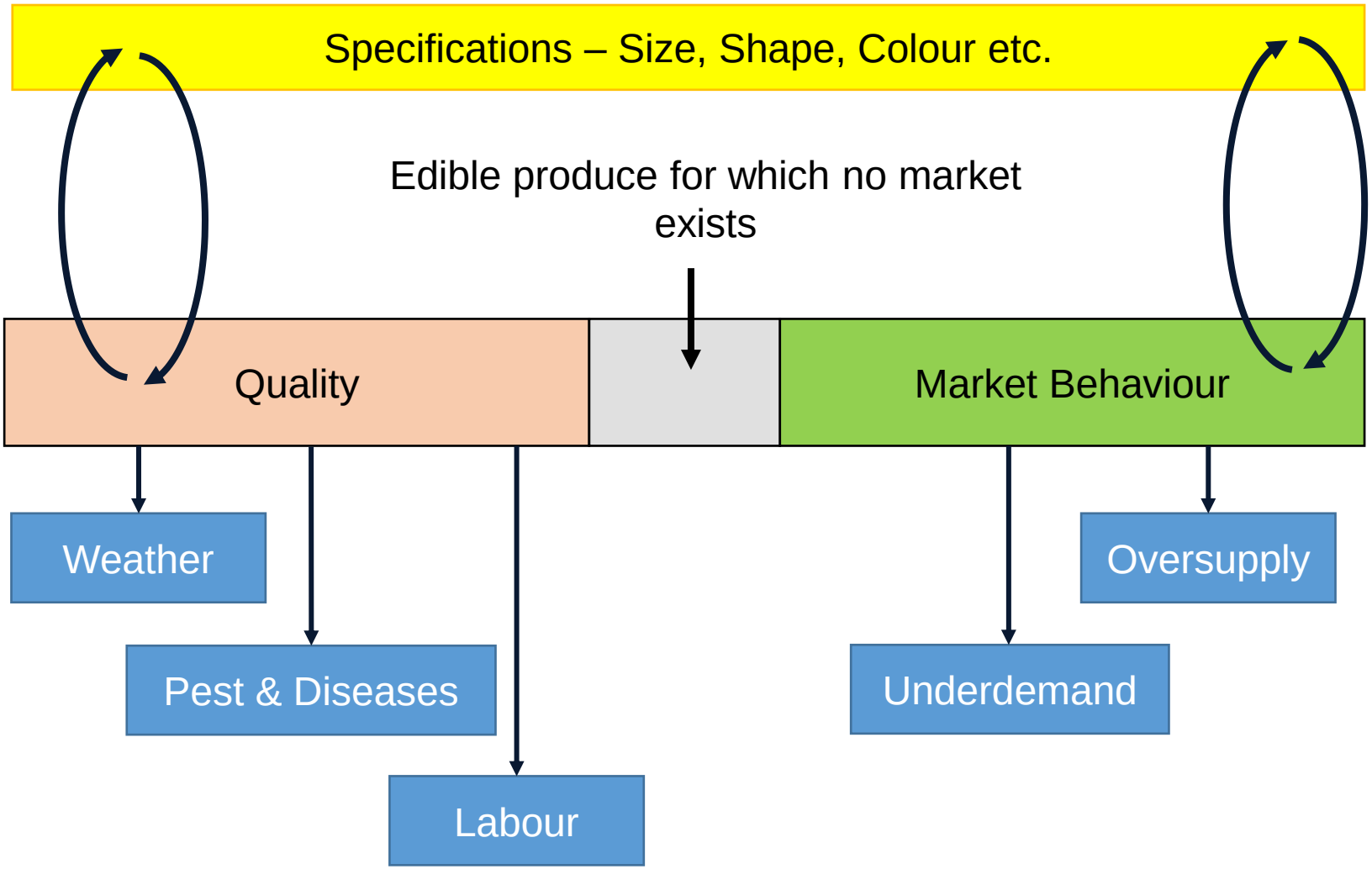


UK as case study

- Up to 57% FLW occurs between harvest and retail, with particularly high contributions from field vegetables and soft fruit.
- Harvest and handling greatest contributor to loss and waste due to imposition of quality standards at harvest and supply/demand mismatch.
- Broad variation in food loss and waste estimates due to differences between seasons, growing systems and quality requirements hinders accurate quantification.



UK as case study



UK as case study

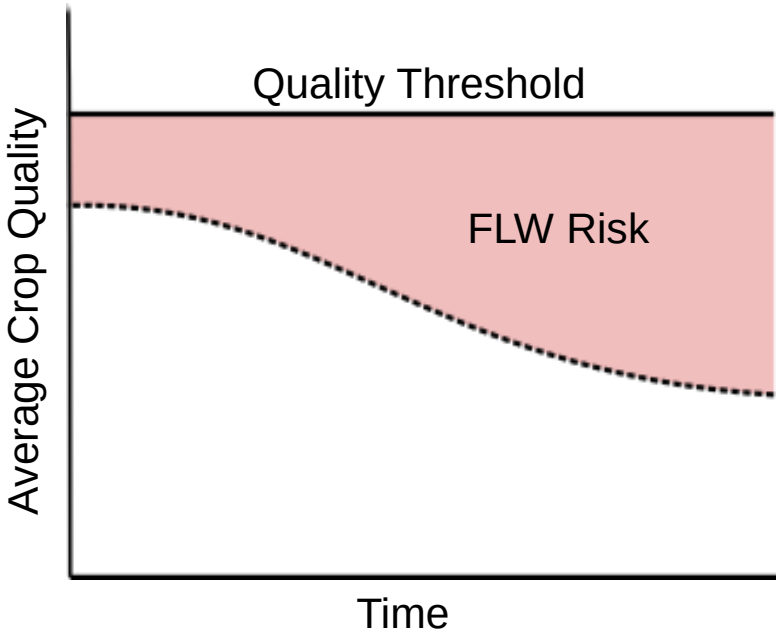
- High on-farm losses due to quality grading and selection at harvest:
  - Pre-harvest factors e.g. pest/disease, climate.
  - Biological/agronomic challenge.
  - Lowest economic impact, variable environmental impact.

- Storage/Packing losses are either due to:
  - Market condition (soft fruit & protected veg) extending storage times.
  - Innate loss risk linked with produce quality (potato, field veg, top fruit).

- Limited capacity for sideflow/alternative use:
  - Internal processing (field vegetable, potato).
  - Reduce losses from waste (top fruit).
  - Waste disposal linked with cheapest option for disposal.

UK as case study

- General concern that food loss and waste will increase in the next 10 years.
- Risks will increase if quality expectations do not change in line with ability to grow crops.
- Pest and disease control is another key concern.
- Differences between sectors:
  - Soft fruit & protected salads have both accommodated integrated pest and disease management, with breeding perceived as more responsive to sector needs.



Average crop quality over time, highlighting food loss and waste (FLW) risk.

UK as case study

- Results showed who the physiological origins of food loss and waste are important for targeting prevention and are often overlooked.

  Understanding postharvest mechanism behind fresh produce behaviour is essential to design efficient and sustainable supply chains.

- Collaborative approach to validate data in global supply chains is the way forward to improve information towards optimised decision-making tools.

  A call for collaboration:

www.cranfield.ac.uk

natalia.falagan@cranfield.ac.uk

@cranfielduni

@cranfielduni

/cranfielduni