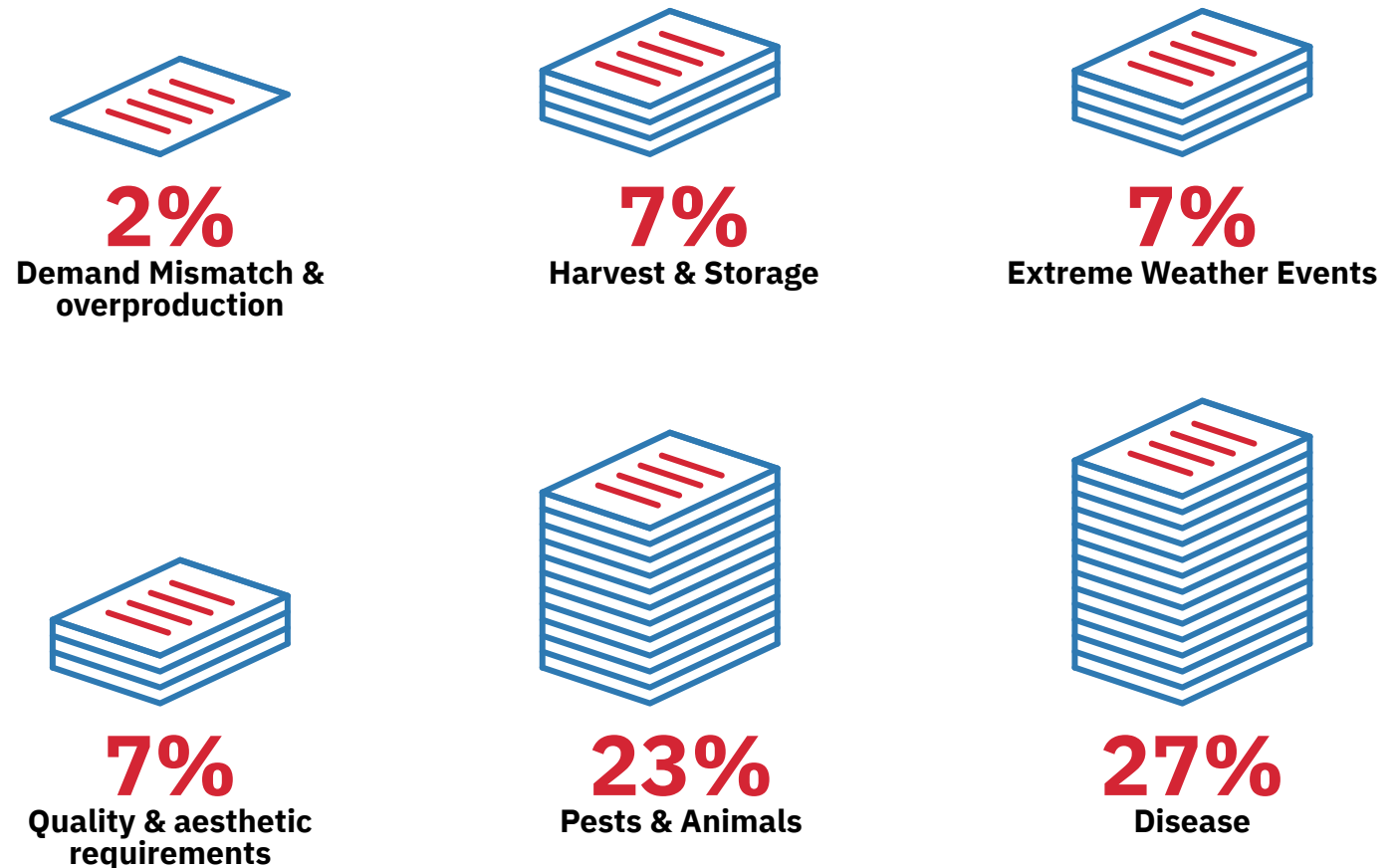


# Causes, Management and Solutions to On-farm food loss and waste (FLW) in the UK

A systematic literature review of 44 peer-reviewed journal articles and 5 government reports, identified 6 major causes of on-farm food loss and waste (FLW) in the UK:

- diseases
- pests & animals
- extreme weather events
- quality & aesthetic requirements
- harvest & storage
- demand mismatch & overproduction.

12 of the studies focused generically on on-farm food loss and waste. This is how each of the major causes were distributed across the remaining articles:

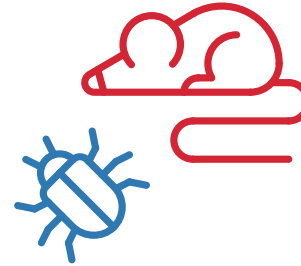


These were the solutions to food loss and waste causes discussed in the studies:



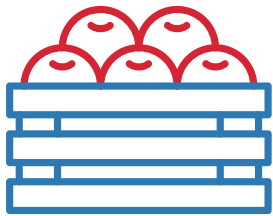
## Diseases

- Shorter / longer rotations
- Gene editing (super genes)
- Epidemic forecasting through weather/climate
- Fungicide and herbicide treatment and timing
- Disease and weed management strategies
- Altered sowing times
- Using crop cultivars with greater resistance or tolerance



## Pests & Animals

- Integrated pest management
- Pest outbreak forecasting through satellite and weather data
- Information sharing across countries
- Push-pull control method
- Border surveillance
- Scaring methods combined with sacrificial crops
- Buffer strips to enhance semi-natural habitat
- Using natural enemies, biocontrol agents,



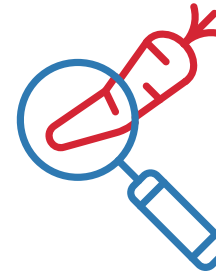
## Harvest & Storage

### Harvest:

- Improved plant management and husbandry
- Investing in improved machinery
- Controlled traffic farming
- Improved monitoring of crop maturity
- Weed management decision support system

### Storage:

- Investing in processing and freezing facilities
- Weather assessment before harvesting



## Quality & Aesthetic Requirements

- Collaboration with customers (retailers, wholesalers etc)
- Hiring agronomist specialist
- Direct sales to consumers
- Campaigns to change consumer perception and behaviour
- Redistribution



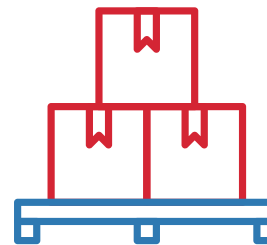
## Extreme Weather Events

### Extreme Precipitation Events:

- Waterlogging-tolerant genotypes
- Altered sowing times
- Improve soil structure to enable drainage

### Temperature & Drought Stress:

- Improve soil structure to increase water holding capacity
- Policy assistance / Government support



## Demand Mismatch & Overproduction

- Collaboration with customers (retailers, wholesalers etc)
- Direct sales to consumers
- Greater transparency and feedback mechanism
- Policy assistance / Government support

## Highlights

- Research quantifying, understanding and addressing all potential aspects of on-farm FLW is severely lacking.
- Despite clear management challenges in some causes of FLW, none of the articles reviewed in this study is published in an Operations and Supply Chain Management journal.
- Many facets of FLW have not been covered in the academic literature e.g., weather resulting in lack of access to farms, transportation issues, reliance on contractor availability, access to facilities, food produced by farms which do not satisfy food standards, change in market prices leading to re-cropping and so on.
- Very few studies on FLW which have accessed or requested data or information from farmers.
- Crops such as lettuce, onions, peas and carrots which have been estimated to have the highest levels of on-farm waste relative to primary production volumes have received little attention.
- Therefore, our current understanding of the quantities of FLW in the UK is speculative and our understanding of the factors that have the biggest impacts on FLW and the opportunities on farms to reduce waste is lacking.

## Research Opportunities

- Increased research effort and greater collaboration between agronomy, environmental science and management researchers
- Increased research on on-farm food waste with farmer participation (co-production)
- Exploring alternative processing and distribution options for surplus on-farm food.
- Increased research on crops (such as lettuce, onions, peas and carrots) that are associated with high levels of waste. This is especially important in lettuce production, considering that freezing and drying are not viable storage options.

