Department
for Environment
Food & Rural Affairs

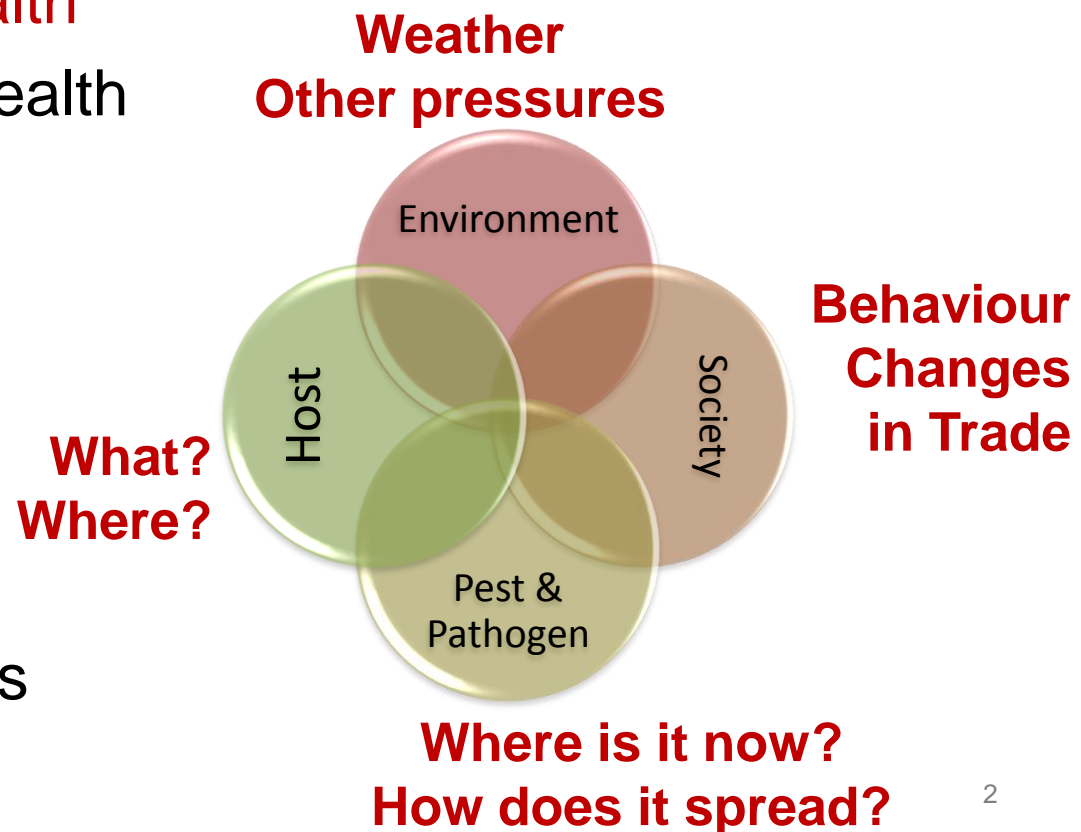# Managing data challenges for evidence-based policy making.

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Policy Landscape

- PH is one of Defra's four strategic objectives:
  - grow the rural economy
  - improve the environment
  - safeguard plant health
  - safeguard animal health

- Cross-cutting
  - Natural Science
  - Social Science
  - Economics
  - Modelling / Statistics

**Weather
Other pressures**

**Behaviour
Changes
in Trade**

**What?
Where?**

**Where is it now?
How does it spread?**

Environment

Host

Society

Pest &
Pathogen

Taskforce Recommendations

Taskforce Key Recommendations:

A. National Context

- **Develop a prioritised UK Plant Health Risk Register.**
- Appoint a Chief Plant Health Officer to own the UK Plant Health Risk Register and to provide strategic and tactical leadership for managing those risks.
- **Develop and implement procedures for preparedness and contingency planning to predict, monitor, and control the spread of pests and pathogens**.
- Review, simplify, and strengthen governance and legislation.

B. International Context

- **Improve the use of epidemiological intelligence from EU/other regions** and work to improve the EU regulations concerned with tree health and plant biosecurity.
- Strengthen biosecurity to reduce risks at the border and within the UK.

C. Capabilities and Communication

- **Develop a modern, user-friendly system to provide quick and intelligent access to information about tree health and plant biosecurity**.
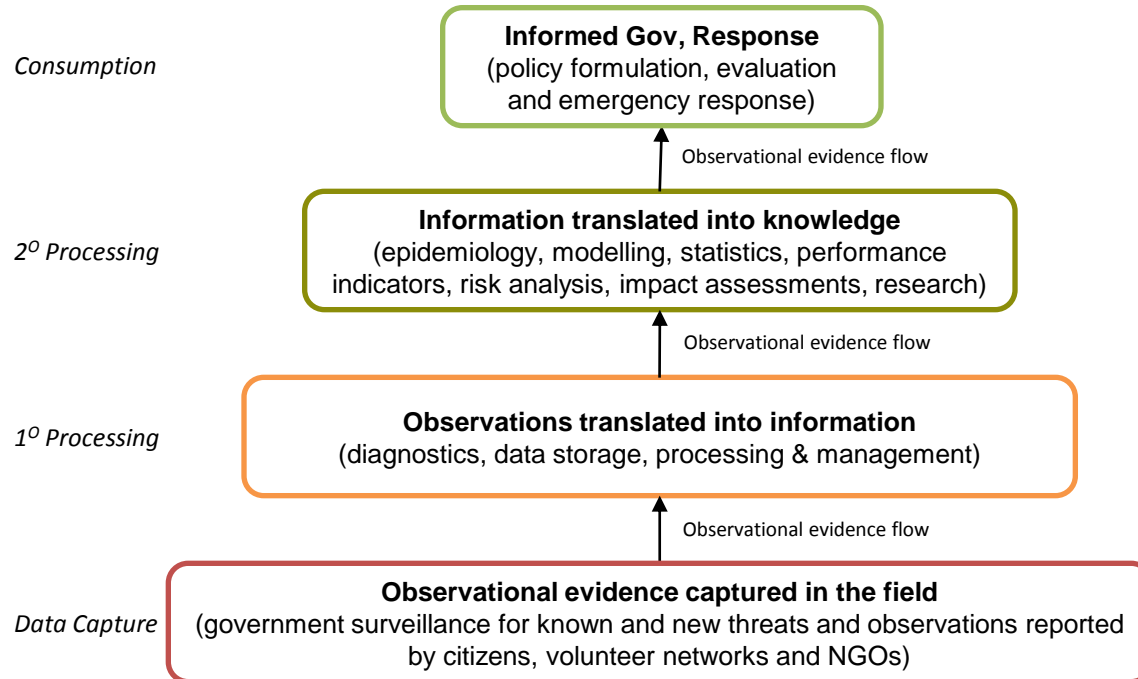- Address key skills shortages.

Evidence

- Evidence: information used to support decisions in developing, implementing and evaluating policy, operations and services.

- Aspiration:
  - Ensure all PH activity is informed by robust evidence
  - Interdisciplinary
  - Proactively share evidence across government, industry and the public and at EU & global levels.
  - Undertake R&D that is policy driven
  - Work collaboratively (coordination, cooperation)
  - Evaluation of activities

Obtaining Evidence

- ## Observational Evidence

Consumption

Informed Gov, Response
(policy formulation, evaluation
and emergency response)

Observational evidence flow

2^O Processing

Information translated into knowledge
(epidemiology, modelling, statistics, performance
indicators, risk analysis, impact assessments, research)

Observational evidence flow

1^O Processing

Observations translated into information
(diagnostics, data storage, processing & management)

Observational evidence flow

Data Capture

Observational evidence captured in the field
(government surveillance for known and new threats and observations reported
by citizens, volunteer networks and NGOs)

- ## Targeted R&D

Use of Evidence

- Task Force
  - Risk Register / Horizon Scanning
    - Prioritisation
  - Contingency Planning
  - Epidemiological Intelligence
    - Modelling Spread
  - Develop systems for quick & intelligent access to information
- PRA
- Policy Options:
  - Assess impact in design stage
  - Evaluation

Risk Register

- Aim:
  - To identify the greatest plant health threats to UK crops, trees, gardens and ecosystems
  - To provide a framework for decision making on priorities for actions

- Ratings (unmitigated and mitigated) for:
  - **L** = Likelihood of the risk arising
  - **I** = Impact on the host plants if it does ⎫ on a 1-5 scale
  - **V** = Value of the host plants in the UK ⎭
- Overall risk rating = L x I x V (on a 1-125 scale)

Contingency Planning

- Allows us to carry out a rapid response to an outbreak or prevent outbreaks
    - Use case studies for contingency planning

- Predict & monitor the spread of pests and pathogens to inform control strategies:
    - Eradication
    - Containment
    - Slow spread & manage impacts
    - Adaptation
    - Increase Resistance (plant level) & Resilience (landscape level)

Epidemiological Intelligence

- Data Requirements
  - Host
  - Pest/Pathogen
  - Environment

- Where do we get data from?
  - Pest/Pathogen
    - What can we learn from previous outbreaks?
    - What can we learn from outbreaks elsewhere?
  - Host:
    - What / Where are they?
  - Environment:
    - How do weather conditions affect impact?

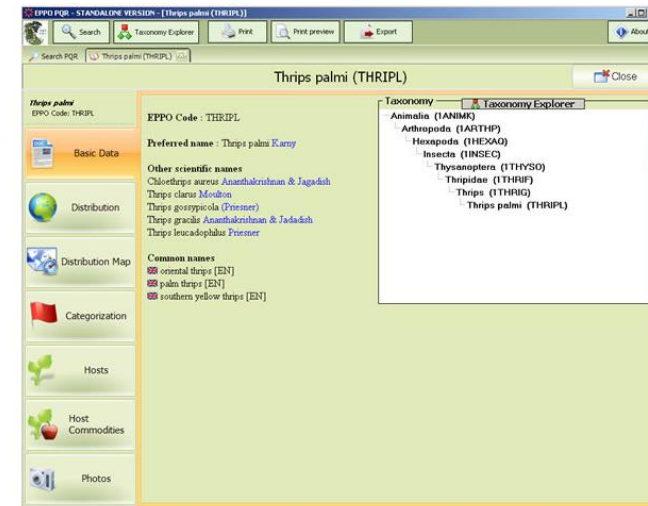Matt Castle, Cambridge University

Average Infected Ash Proportion - GBR 2018

Proportion
100%
75%
50%
25%
0%

N

0 25 50 100 150 200
Kilometers
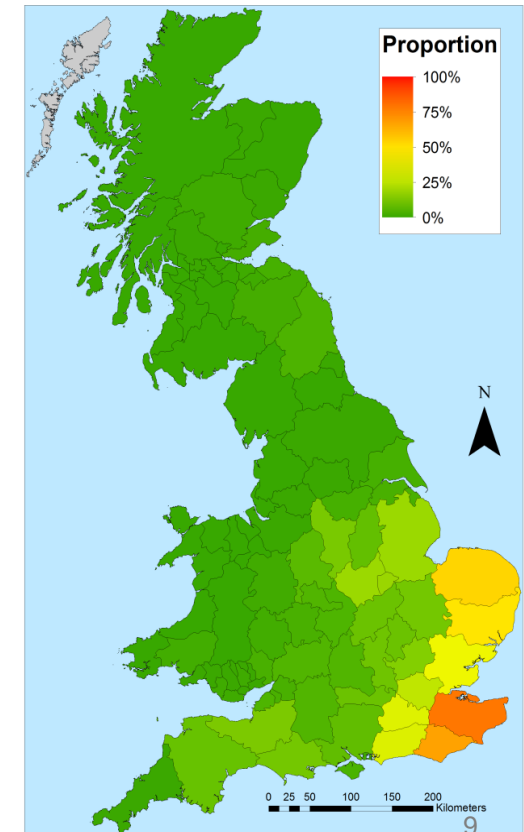
Develop Systems

- Existing Systems:
  - CABI Bioscience
  - EPPO PQR
  - Fera PHIW
  - …

- Gaps:
  - Single portal for PH Information?
  - Data sharing (epidemiology)
  - Citizen Science
  - Host distributions

Plant Health Information Warehouse

- Pest Information Search
- PRA Documents
- EC Lists
- EPPO Lists
- Pathogen Diary
- Policy Decisions
- Precedents
- Licensed Organism Lists

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Horizon Scanning

- How to predict next (unknown) pest
  - Analysis of known threats
    - Pathways
    - Host species
    - Taxa
  - Sentinel Plant Networks
    - Host identification
  - Analyse Trade patterns
  - Monitoring Media
    - ProMed / MediSys
  - Use stakeholders

PRA

- Entry
  - Where is it now?
  - What are current hosts?
  - What are pathways?
- Establishment
  - Can it survive (hosts, climate)
- Spread
  - How fast? How far? To what hosts?
- Impact
  - Economic, Social, Environmental?

Evaluation

- Evidence needed
  - to help develop control strategies before a pest or disease arrives
  - to monitor the success of these strategies once the pest or disease has established
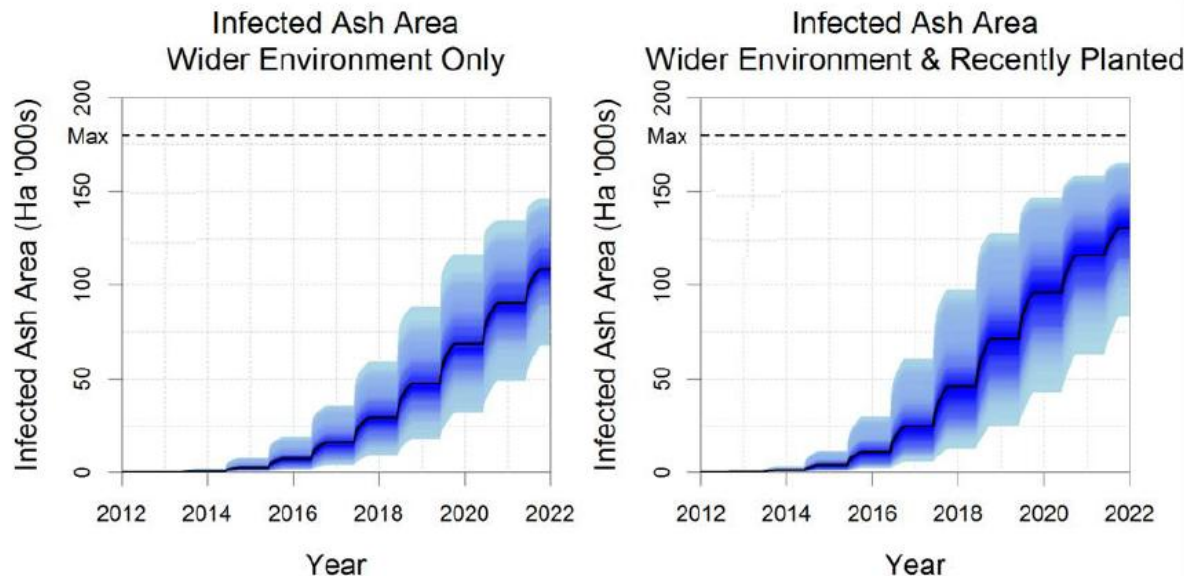
Strategies for Obtaining Evidence

- National R&D
  - Sharing outcomes?
  - Co-planning / Aligning R&D programmes

- Multinational / International R&D
  - Benefits:
    - Leveraging funds
    - Expertise and opportunities
  - Disadvantages
    - Effort and admin
    - Less control?
    - Less relevant?

Data Sharing

- Opportunities
  - More value out of existing data
  - Development of new approaches
  - Examples:
    - Anoplophora outbreak in Kent
    - Chalara - Fraxback

- Barriers
  - Lack of recognition
  - Cost
 - Compatibility of systems

Managing Uncertainty

- Uncertainty caused by limited information on:
  - Pest/Pathogen
  - Effectiveness of control strategies
  - Impacts

- Risks of not managing uncertainty:
  - Impact on policy decisions and control strategies

- Future R&D

- Essential to assess impact of uncertainty (quantitatively or qualitatively)
  - Quantitative: Stochastic Modelling
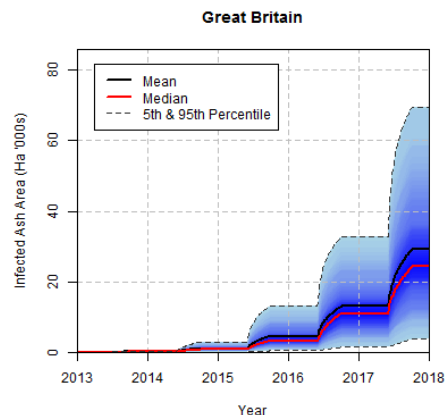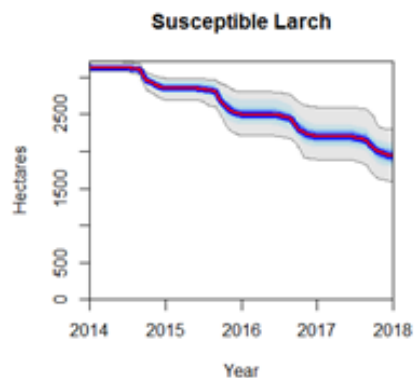 - Qualitative: Expert Judgement / Uncertainty Tables

Examples

- PRA
  - Use of BBNs instead of conventional scoring systems
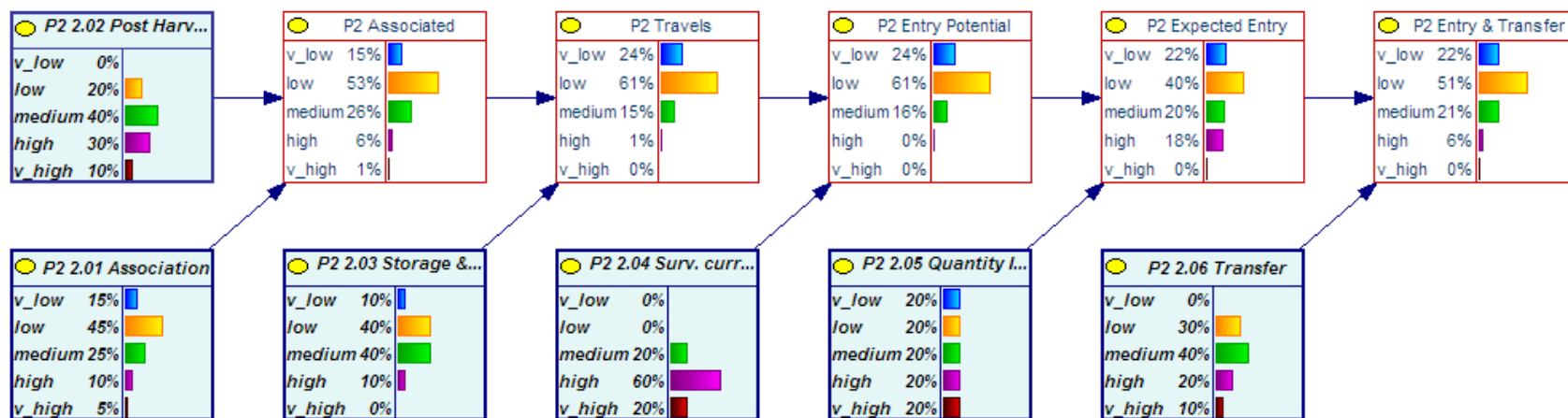
- Spread

Conclusions

- Evidence is essential for safeguarding plant health
  - Many activities in PH depend on access to data
    - Access to many types of data still limited
  - We need to
    - Obtain access to different types of data
    - Better engagement between data users and data collectors
    - Build better systems for easy access
    - Share data to obtain the most benefit from existing data sets

- We need to understand strengths / weaknesses of evidence
  - Uncertainty Analysis
    - Inform policy decisions
    - Prioritise evidence gathering