# *A generic decision tool for assessing response options to tree pests in the UK*

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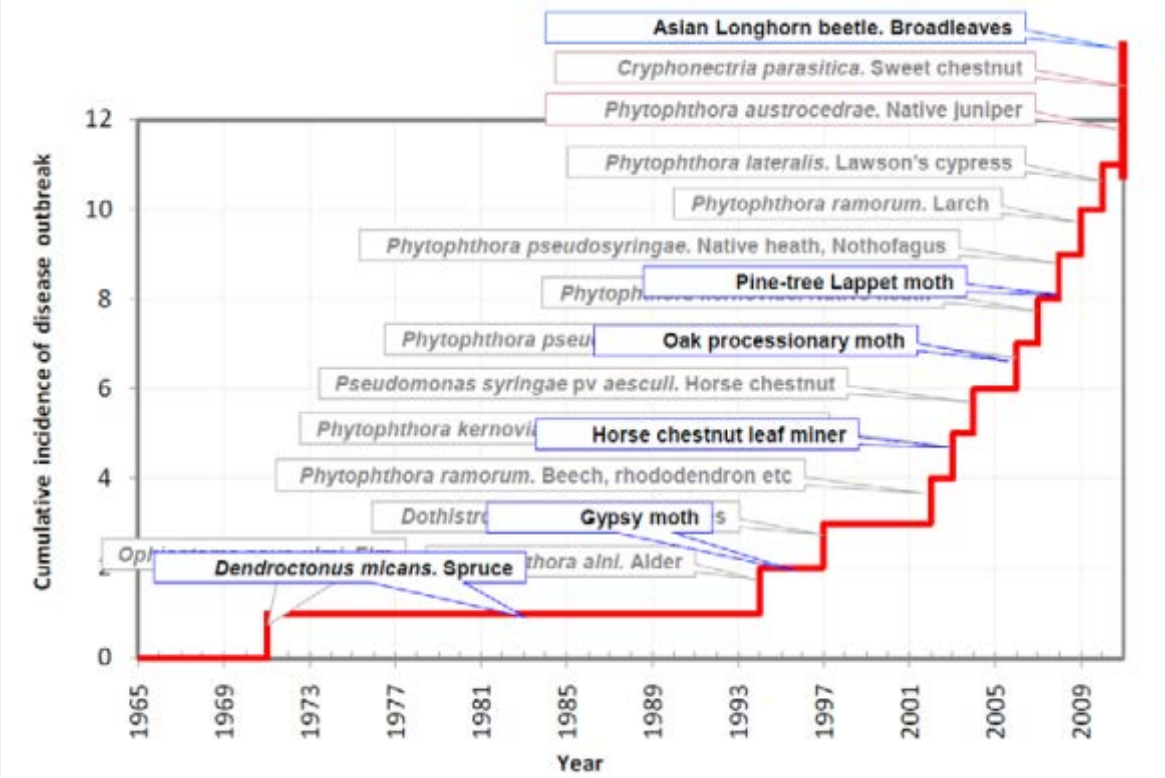
Environmental Economist
Fera




11th meeting: Ottawa, Canada 29 August-1 September 2017

# Content

- What we were asked to do
- How we did it
- Decision Support Tool
- Limitations

NB: we haven’t finished it!

# Some Australian words of wisdom ……

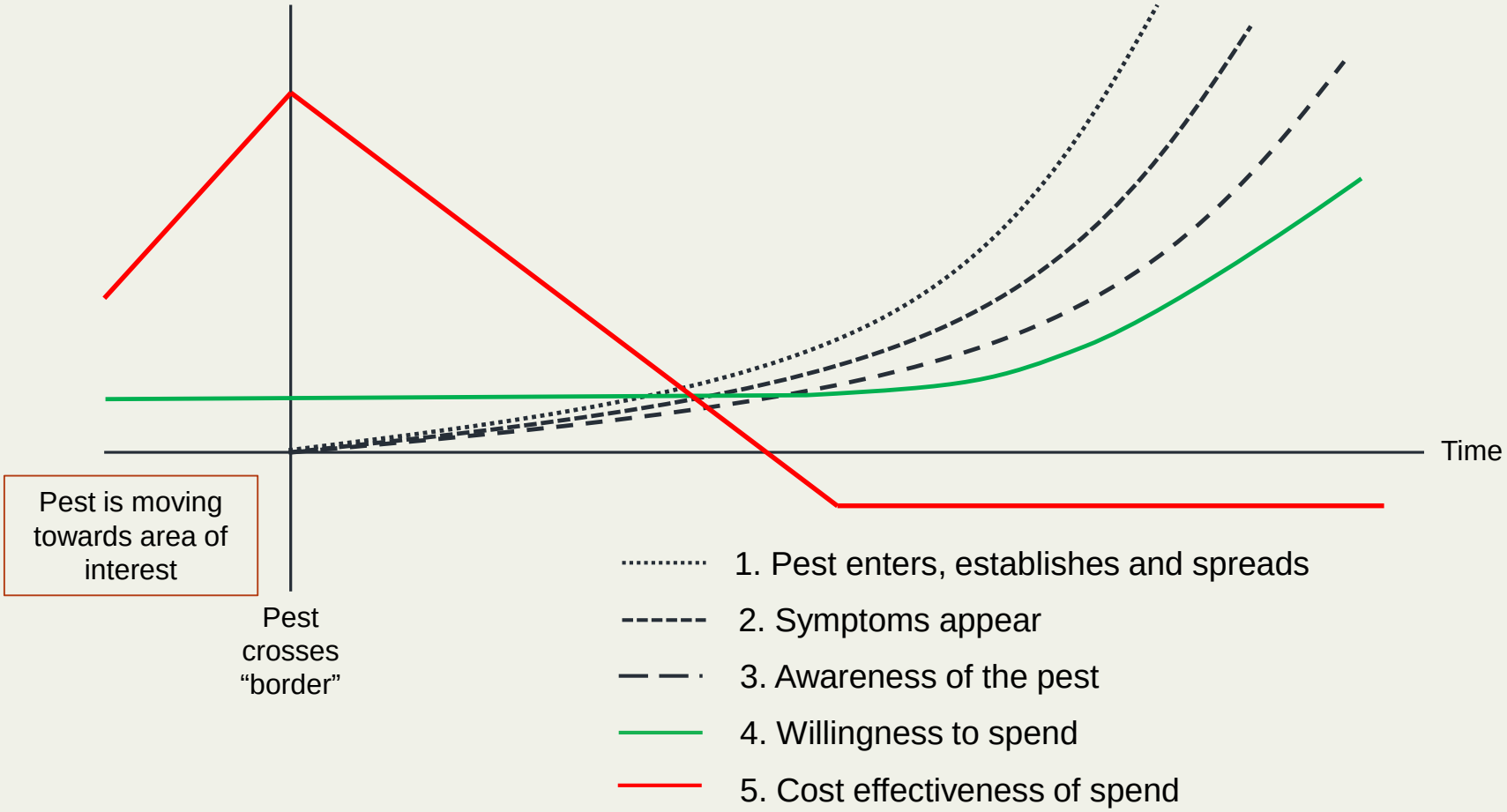
*Virtually all decision support people are time-pressured ….. seldom have the luxury of researching specific species in detail over months or years*

*……usually asked to predict the economic, environmental and social impacts of threatening or newly-arrived species in areas they have not been observed in before; all within a matter of hours, days or (at best) weeks.*

*……Moreover, the context to which a response effort is to be made constantly changes due to external pressures*

(Cook, D.C.,Wilby, A., & Fraser, R.W. Improving Plant Biosecurity Policy Evaluation and Prioritisation: The Economic Impacts of Pests and Diseases)

# Why do we need a Decision Support Framework?



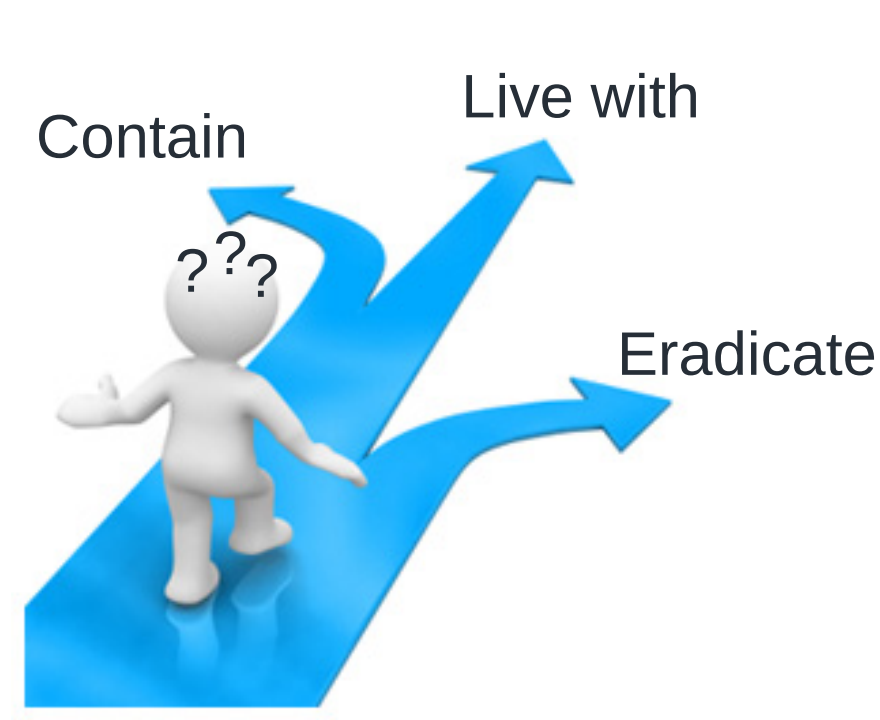

Source: Ward, M (2016). Action against pest spread—the case for retrospective analysis with a focus on timing. Food Security 8, pp77–81

# What we were asked to do

## Develop a Decision Support Framework & Tool for tree pest/disease management

Requirements:

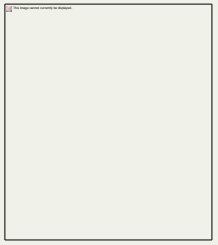
- Generic
- Clear and replicable
- Simple and transparent
- Quick results
- Easily accessible to a range of end-users



# Project team




Modellers

Economics and ecosystem services


Modellers

# Customer

# Development process

Steering group meetings:

- Model requirements
- Choice of platform
- Additional outcome: **more input from policy makers needed**

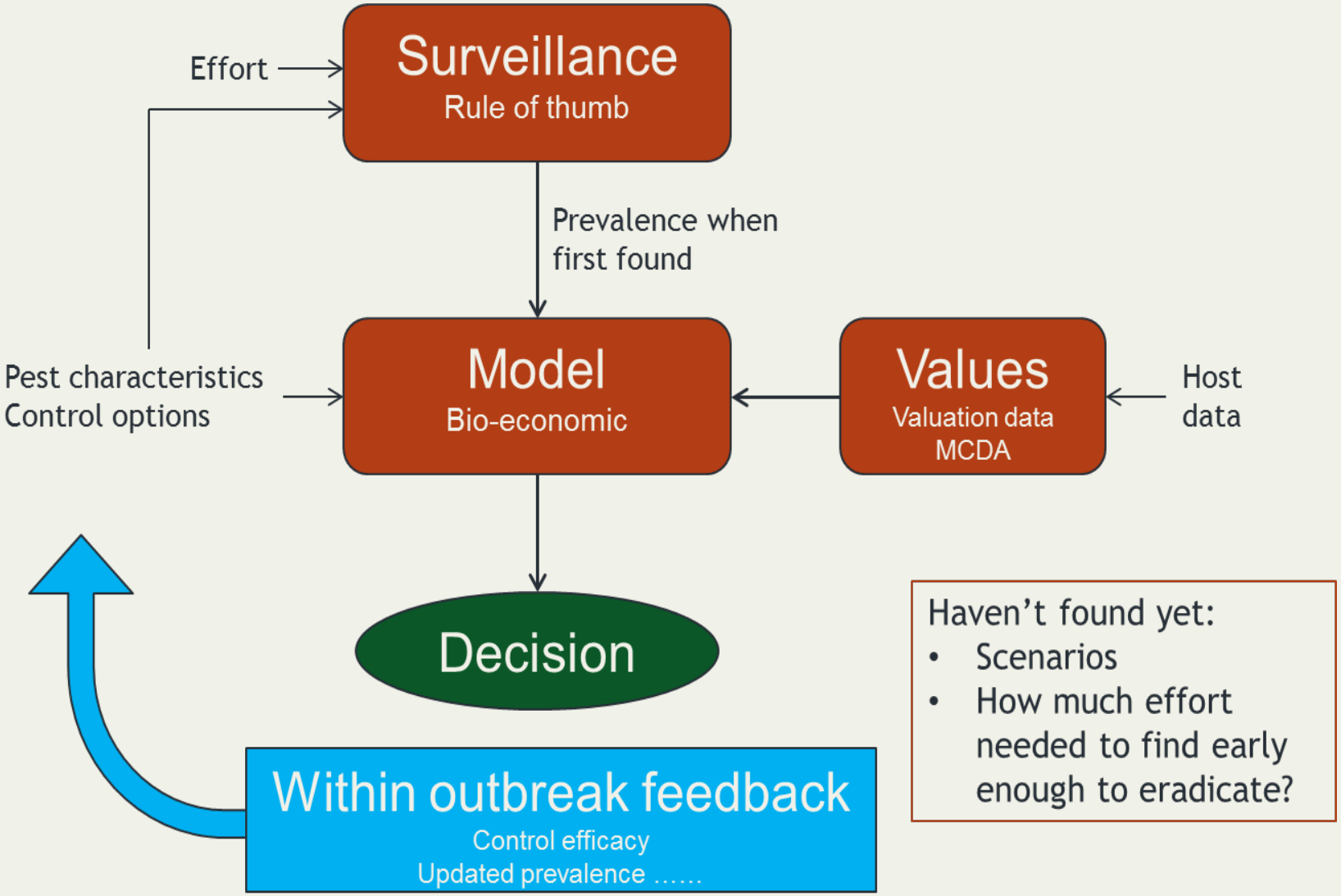
Stakeholder workshops (co-design of the tool):

- Attending: PH policy makers, social scientists, modellers,…
- First WS: How will the outputs be used and how should they be presented?
- Second WS: presentation & feedback on working version of tool

Project advisory group reviews:

- Feedback on process and model

# “Straw man” model




Haven’t found yet:

- Scenarios
- How much effort needed to find early enough to eradicate?

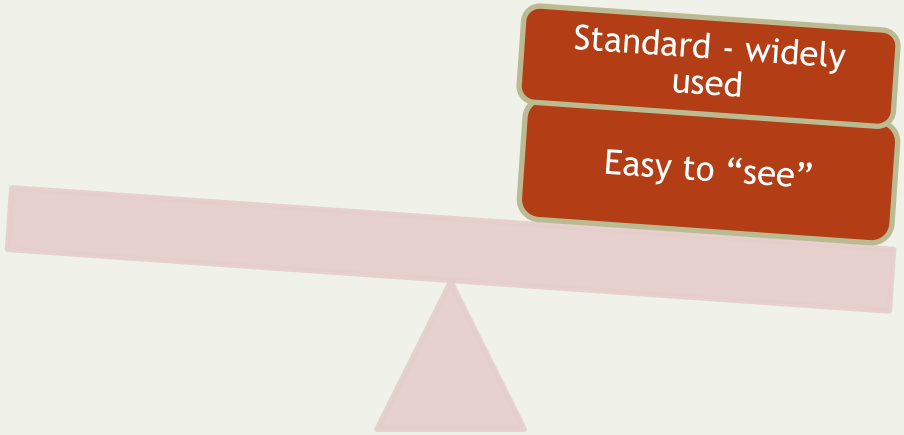
# End-user Needs

- Standardised framework for scenario assessment
- Help integrate quantitative model outputs:
  - Set quantitative analysis into context
    - Legal, social,… implications of management options; urban vs natural environment; “What-if” scenarios
  - Assessment of uncertainty
  - Easily digestible visualisations
- Can be used and understood by a range of end-users

Provide a basis for the narrative between the quantitative cost benefit analysis and the policy decision that includes wider social and political concerns

# Choice of Platform





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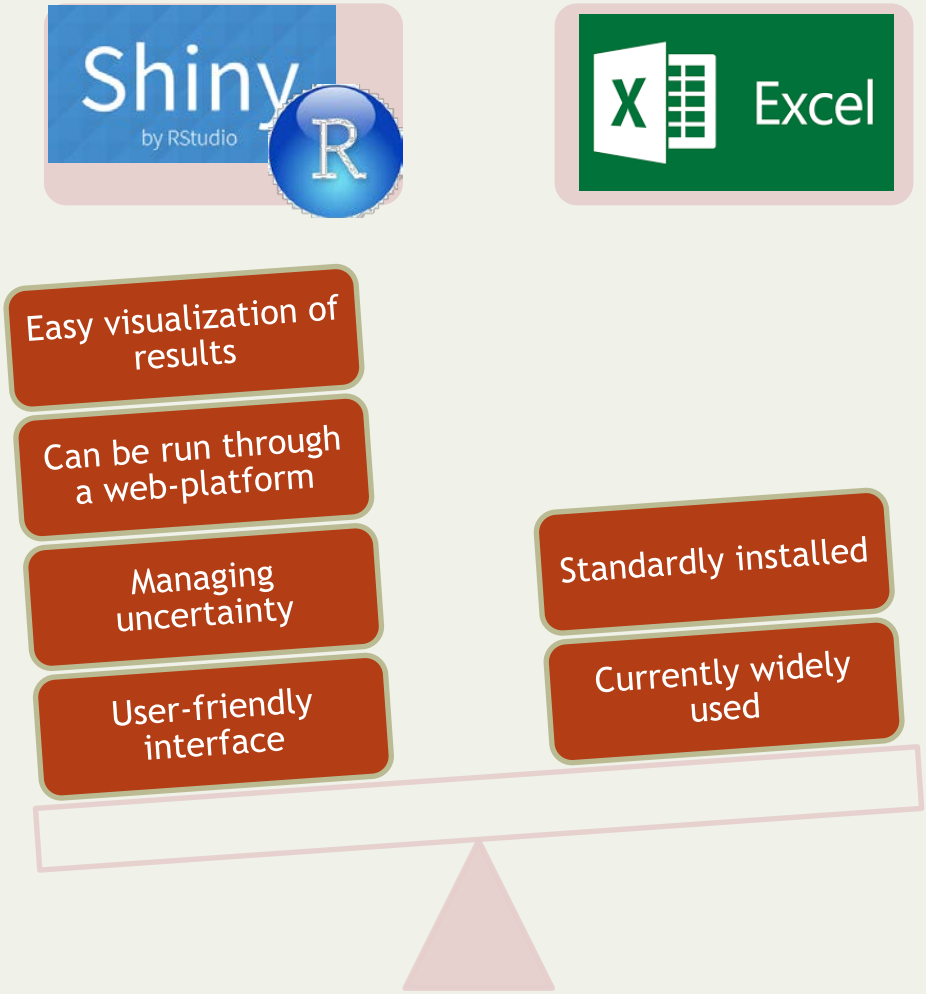

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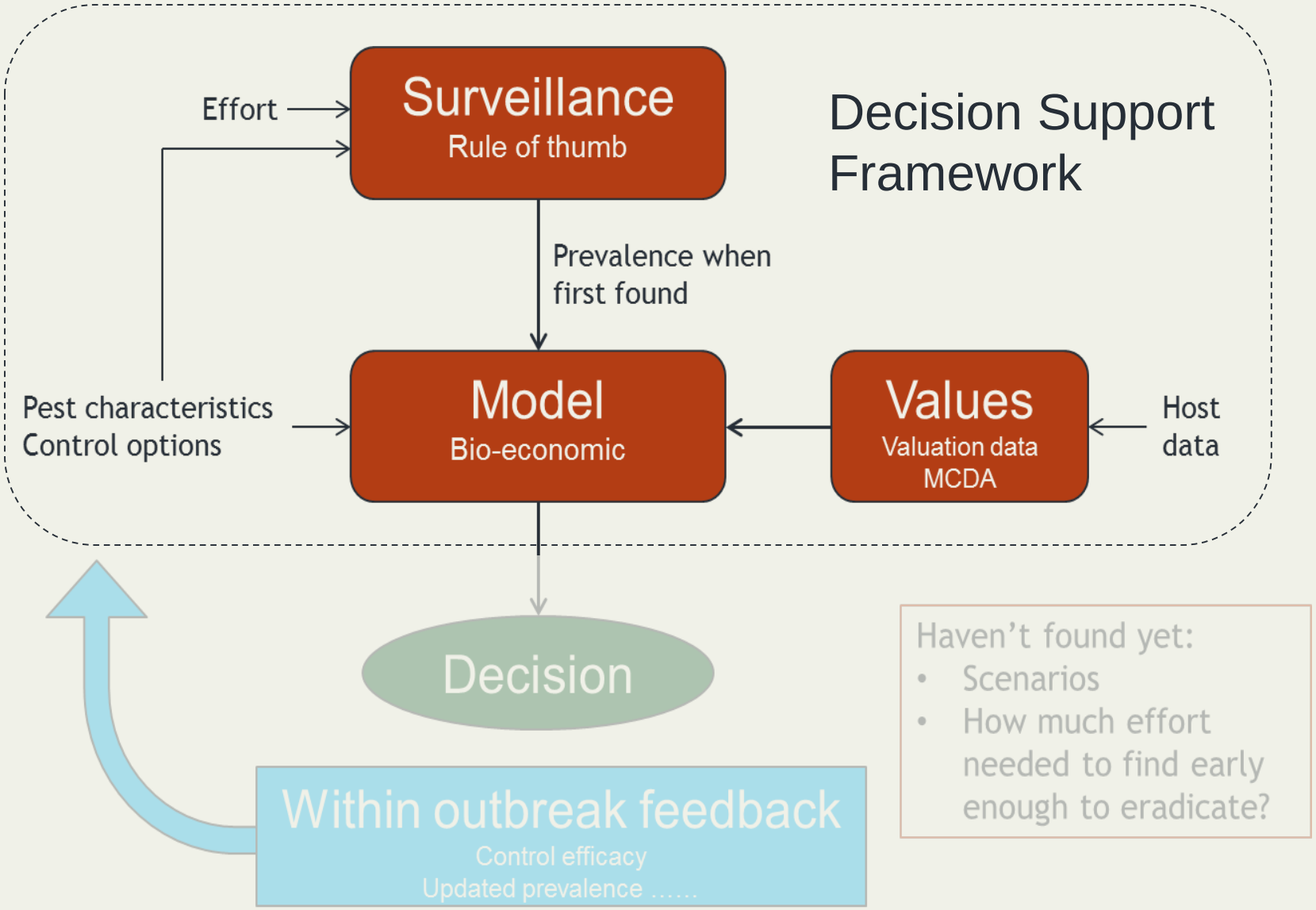

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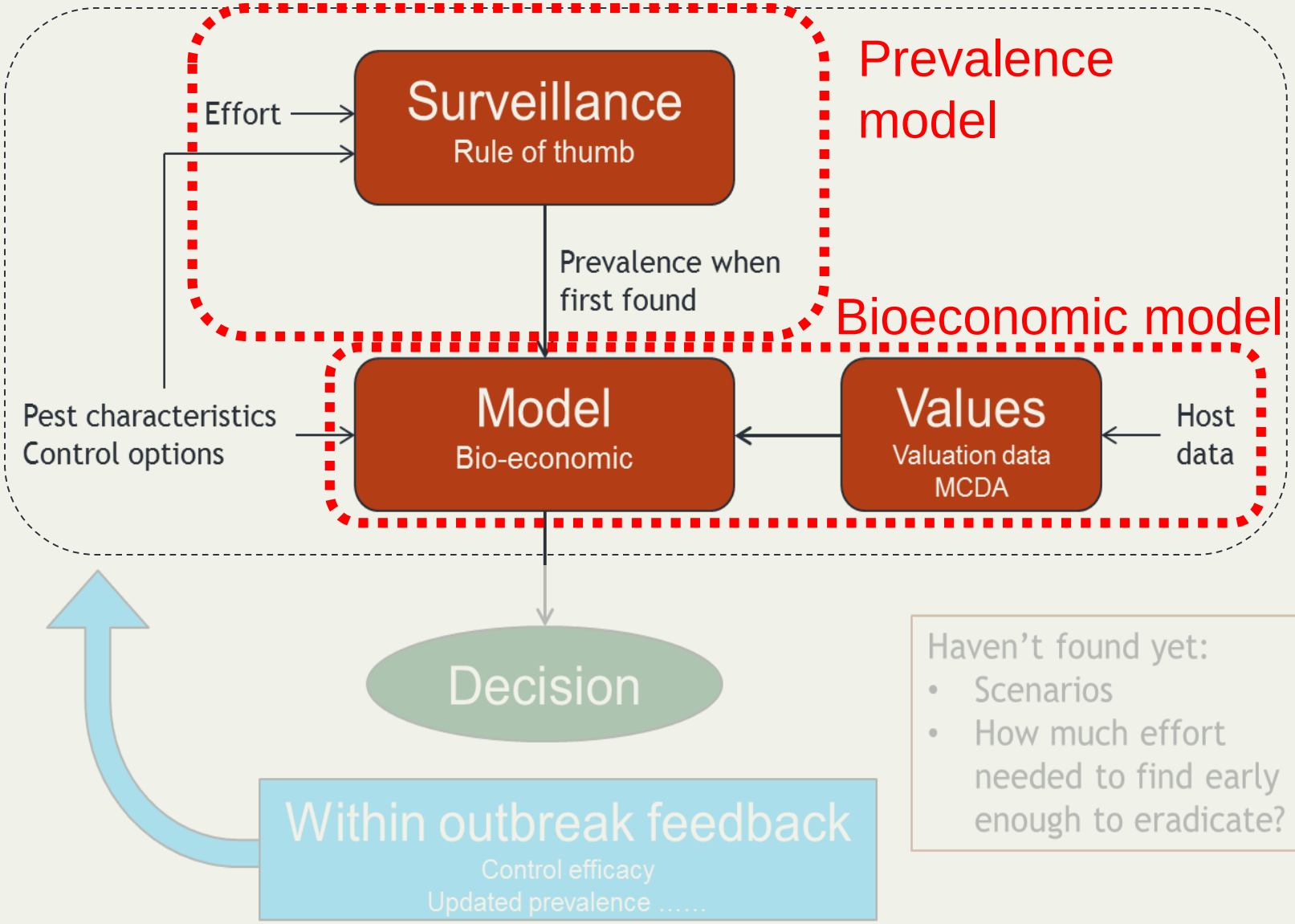


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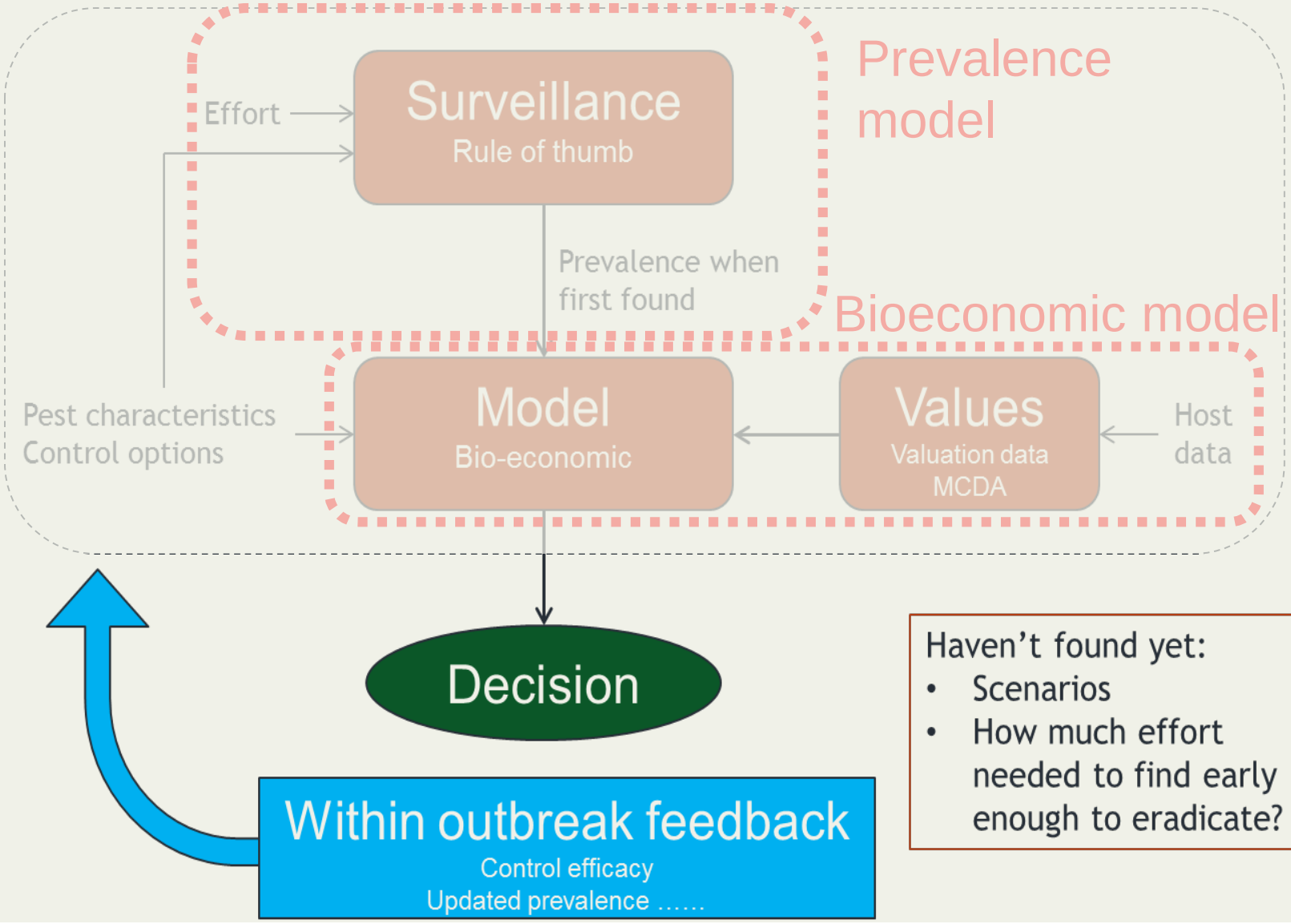


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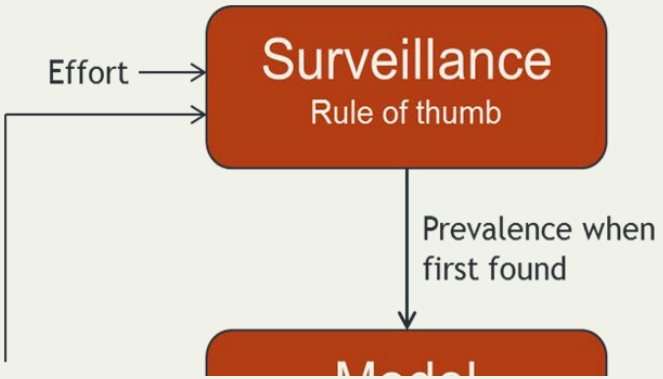
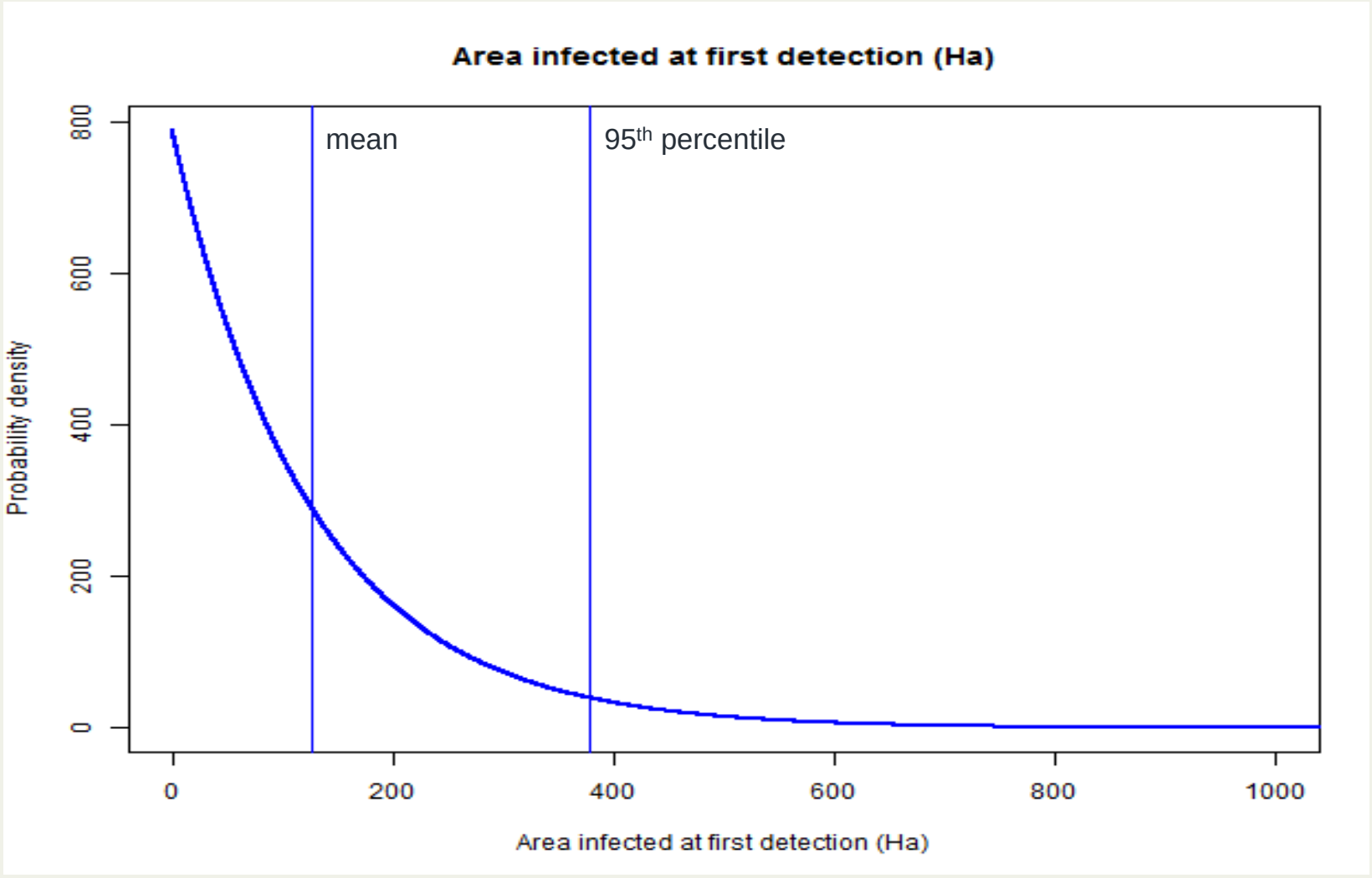
# Prevalence model



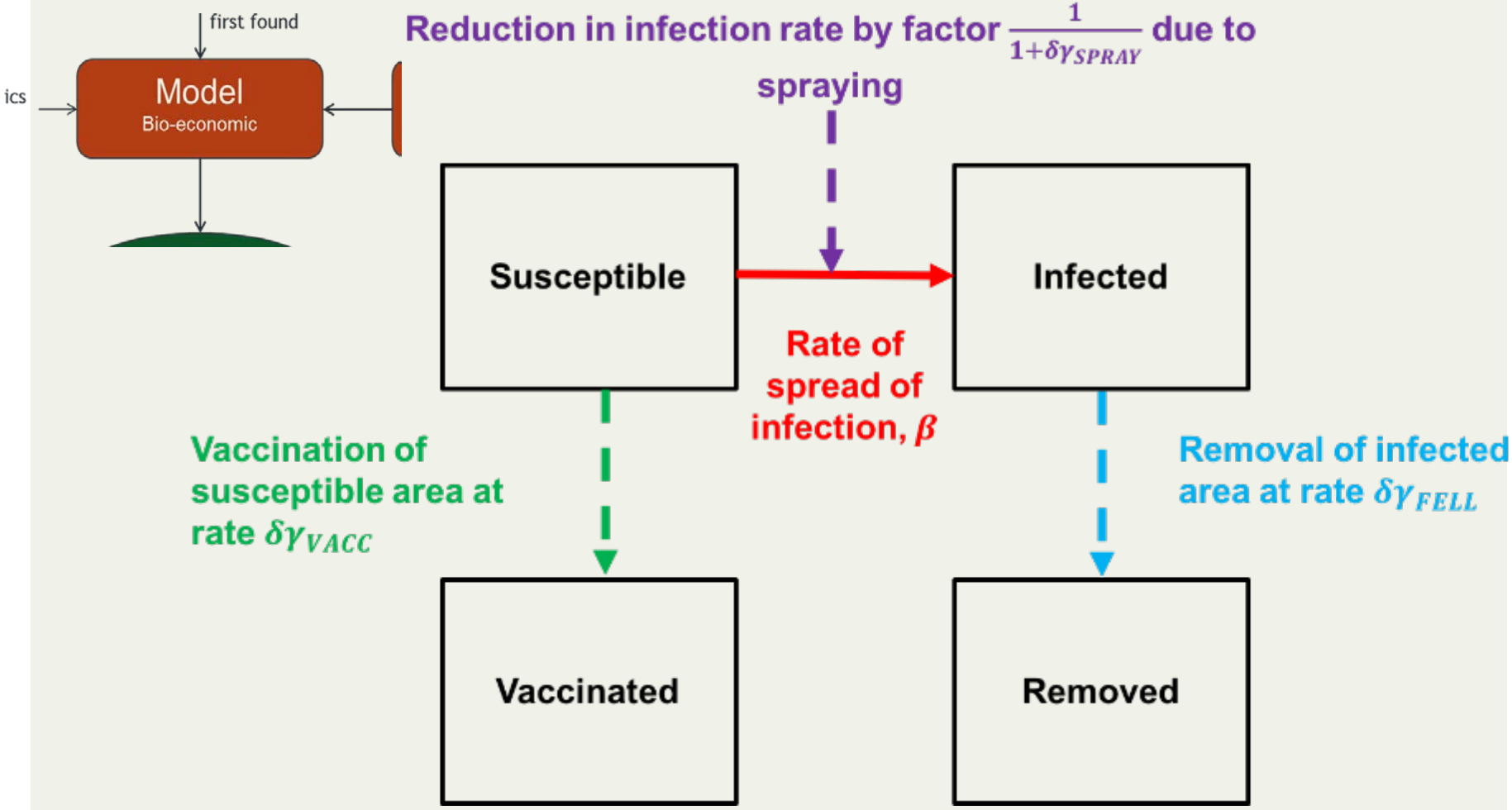

Estimates the **proportion of affected hosts (the "incidence") at the time of first detection**, based on:

- Total host area
- Spread rate + uncertainty
- Interval between sampling
- Number of samples

# Prevalence model



# Epidemiological model: SIVR

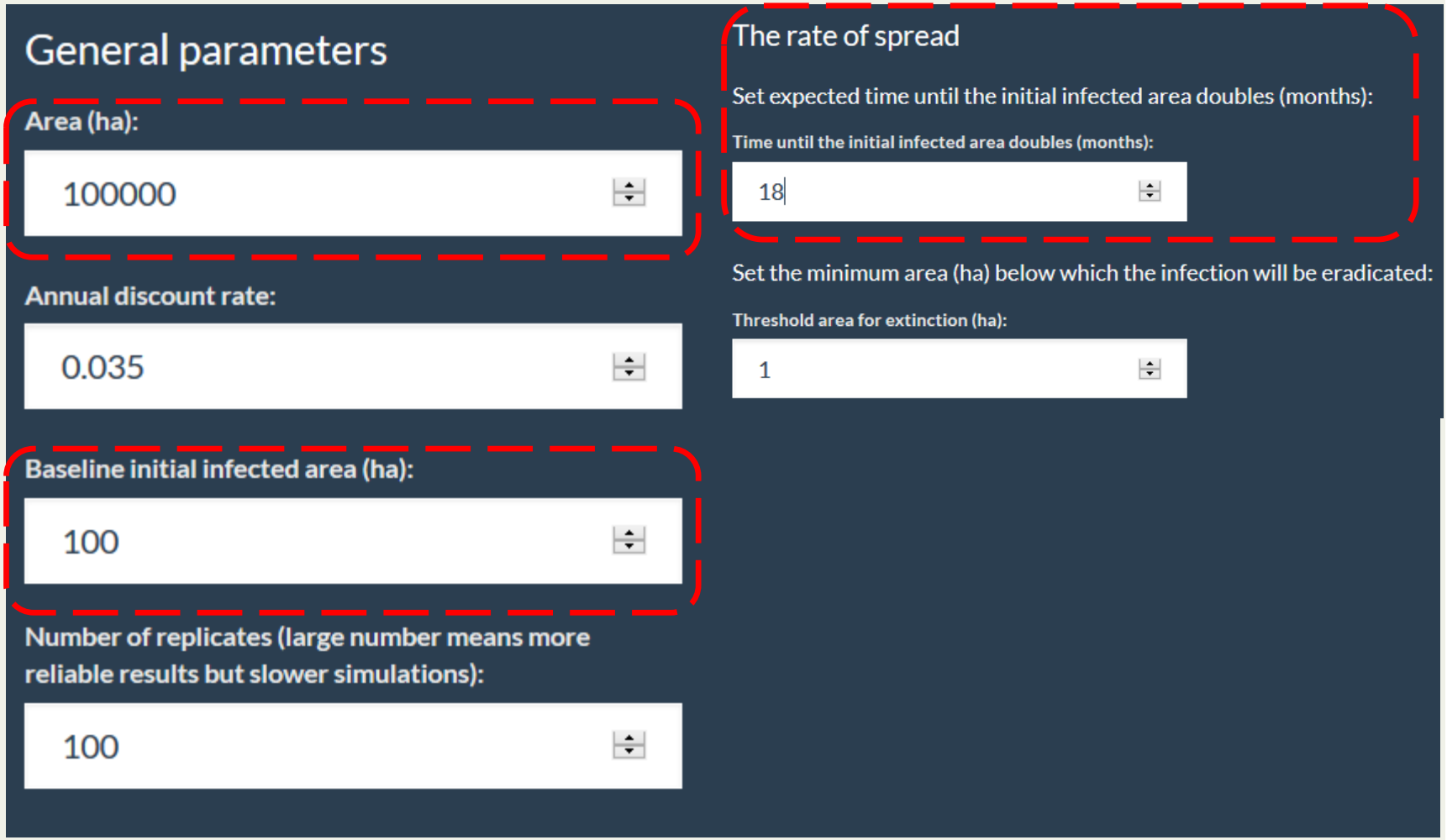


# Environmental Values

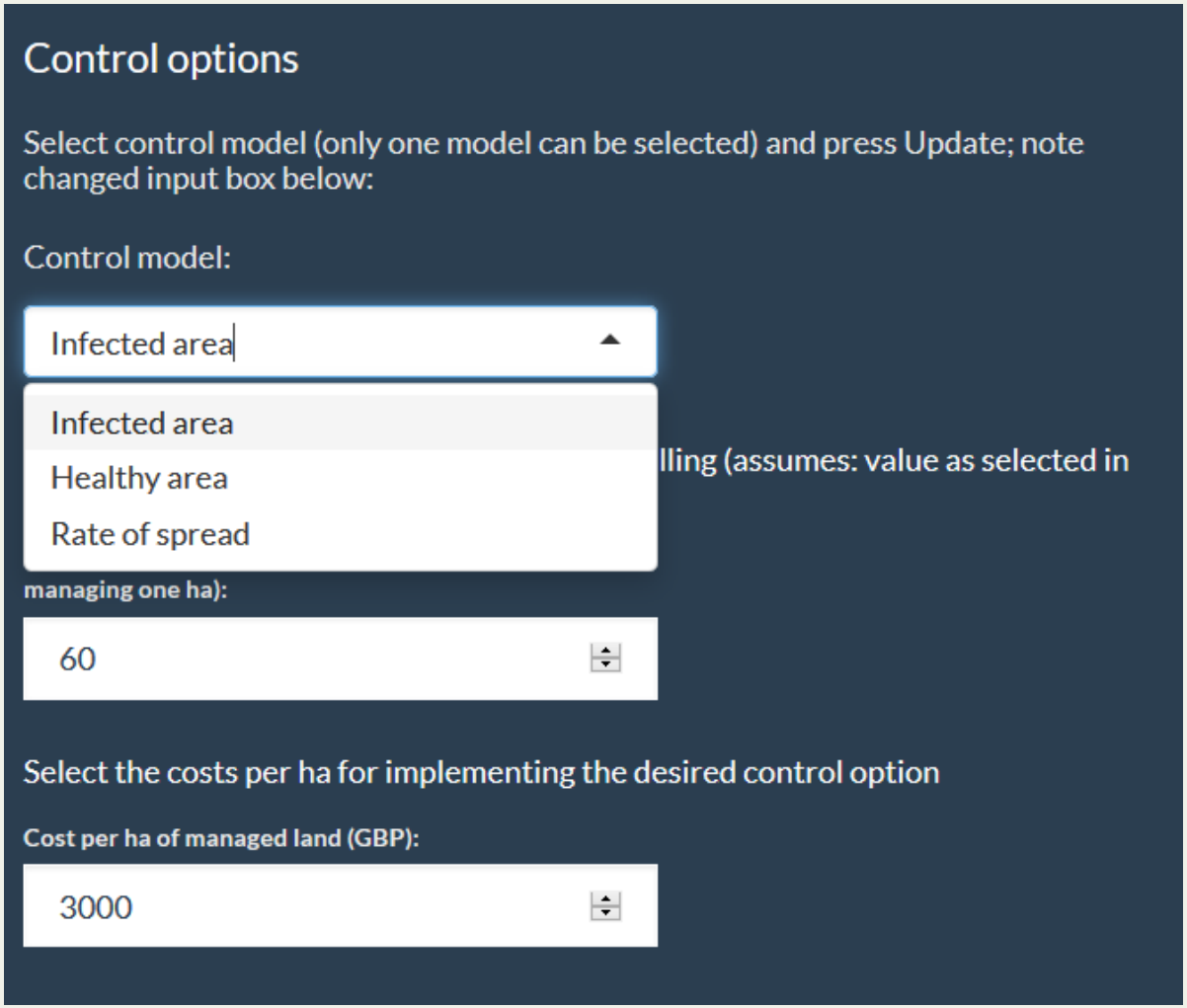

Timber, landscape, carbon, biodiversity, recreation, air quality, “other”

- Various issues
  - Old stated preference data (pre-2003) not produced to value ecosystem service losses
  - Context – urban trees v wilderness trees
  - Recommendation from PAG not to use the biodiversity value

# User Inputs – initial set up



# User Inputs – type of control, efficacy, & cost



# User Inputs – values saved or lost

## Values at risk

Specify the value of timber (assumes continuous cropping and no changes to age structure):

Value from healthy forest

(please use the sliders to select lower and upper values; separate the sliders if necessary)

**Timber (GBP per ha):**


Value for infected forest (% of healthy)

(please use the sliders to select a single value)

**% of healthy value:**

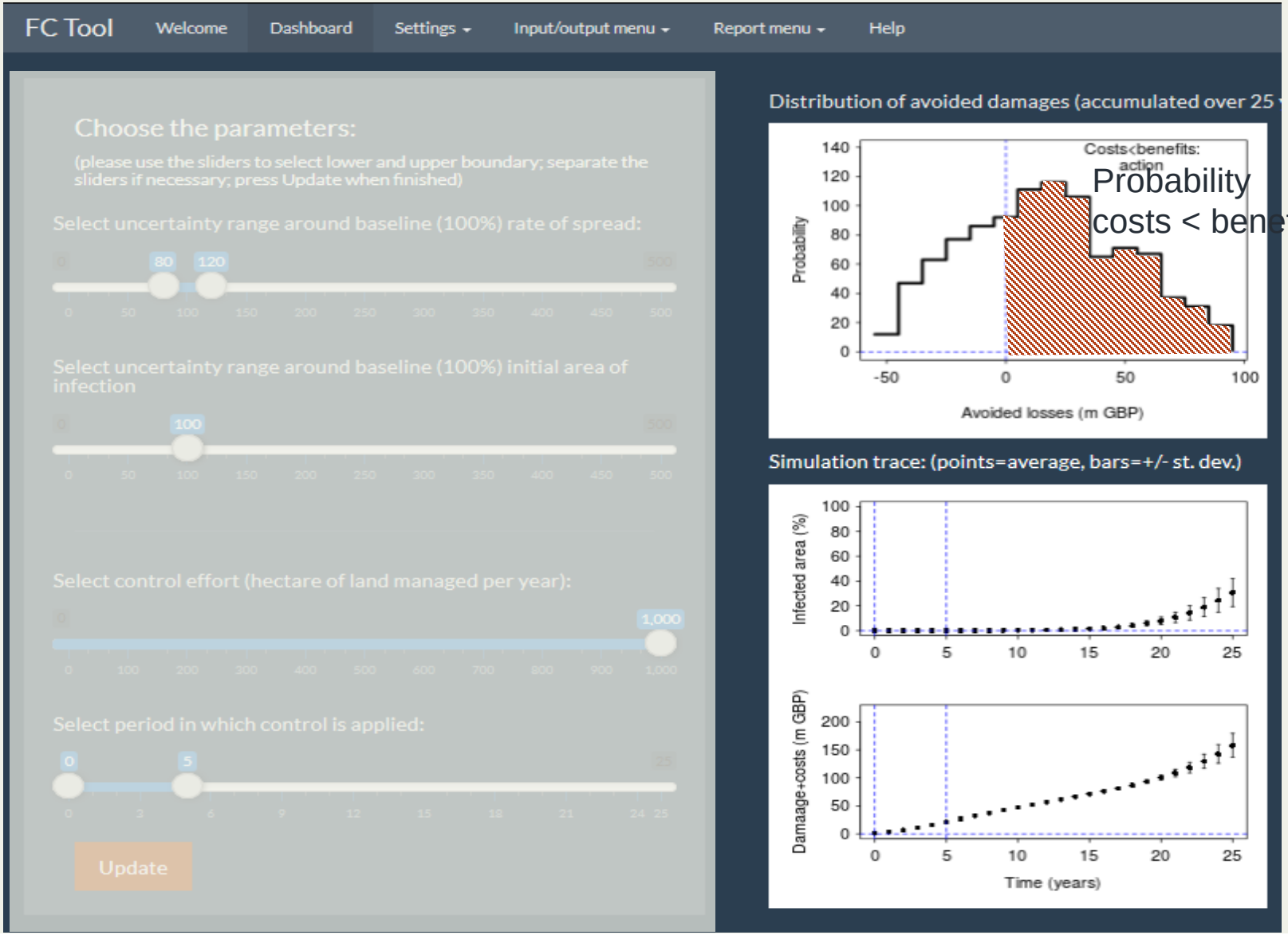
# User Inputs – uncertainty, effort


Uncertainty in rate of spread and initial prevalence

Area controlled per year and number of years controlled

# Other User Inputs

# Outputs




Probability costs < benefits

# Limitations

- Only one spread model
- Spread assumed constant over time
- Limited control options
- Environmental values
- … there are others!

= future development opportunities!

# The C$80.64m question (US$ = C$1.26)

- Will it be used?
- Should it be used?

Any suggestions for improvements gratefully received