Invasive Animals CRC

Decision Support Systems for improving invasive rabbit management in Australia

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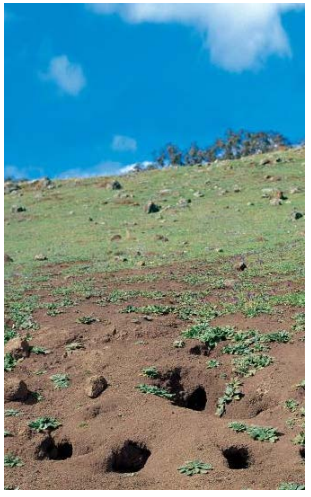


Background…1

- Rabbit Haemorrhagic Disease (RHD) released in 1996 (significant reduction in rabbit abundance)
- Rabbits now developing resistance to RHD
- Increasing need to use conventional control tools

Aerial baiting

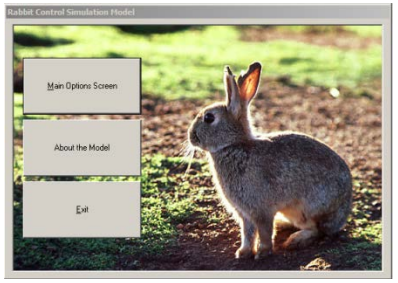
Ground-baiting

Warren ripping

Background…2

- Land managers are asking for Decision Support Systems (DSS) to assist them in developing effective rabbit management programs.

- Four DSSs have been developed
  - MAF ‘Rabbit’ DSS (NZ)
  - Rabbit Control Simulation Model (Aus)
  - Economic decision model for rabbit control to conserve native vegetation (Aus)
  - Rabbit Management Adviser – ‘RabMan’ (UK)
- Limited adoption -why?
- So should we develop more?



Objectives

Requested to develop two DSSs:

1. Allocating funding resources to rabbit management on public lands in the Australian Capital Territory (ACT)- (protect conservation, amenity, and economic values)
2. Improve rabbit management decision making by enabling wool production farmers to better understand the potential cost-benefits of rabbit management and to encourage best practice.

Why have previous DSSs failed?

- Developed by scientists without involvement of end-users (science driven rather than end-user pulled)
- Seen as a complete advisor rather than one part of a bigger decision-making process
- Focussed on outputs rather than the desired management outcomes
- Stakeholders often had expectations larger than the DSS outputs

How do we make DSSs useful…1

Tool features

- Fit for specific purpose (generic approaches don't work)
- Easy to use, user-friendly interface
- Readily available and easily updated (open-source)

Development process

- Participatory approach
- Stakeholders involved at all stages of development

To support decision making, knowledge management, collaboration and learning

How do we make DSSs effective…2

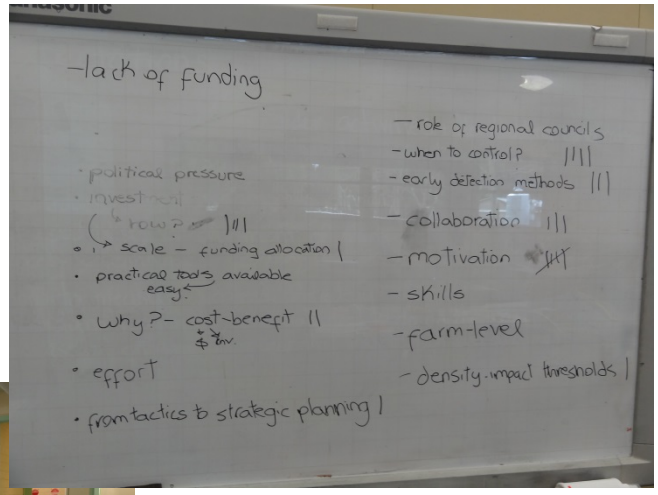
Focus on ultimate outcomes!

- DSS projects often focus on what and how rather than why?
- Rabbit management is about **protecting** and enhancing environmental, social and economic **assets (ultimate outcome)**, not killing rabbits (activity)
- Therefore need an outcomes-based approach for project management and evaluation: **'Theory of Change' (TOC)**
- This develops a big picture of where the project's activities and outputs fit to achieve the desired outcomes

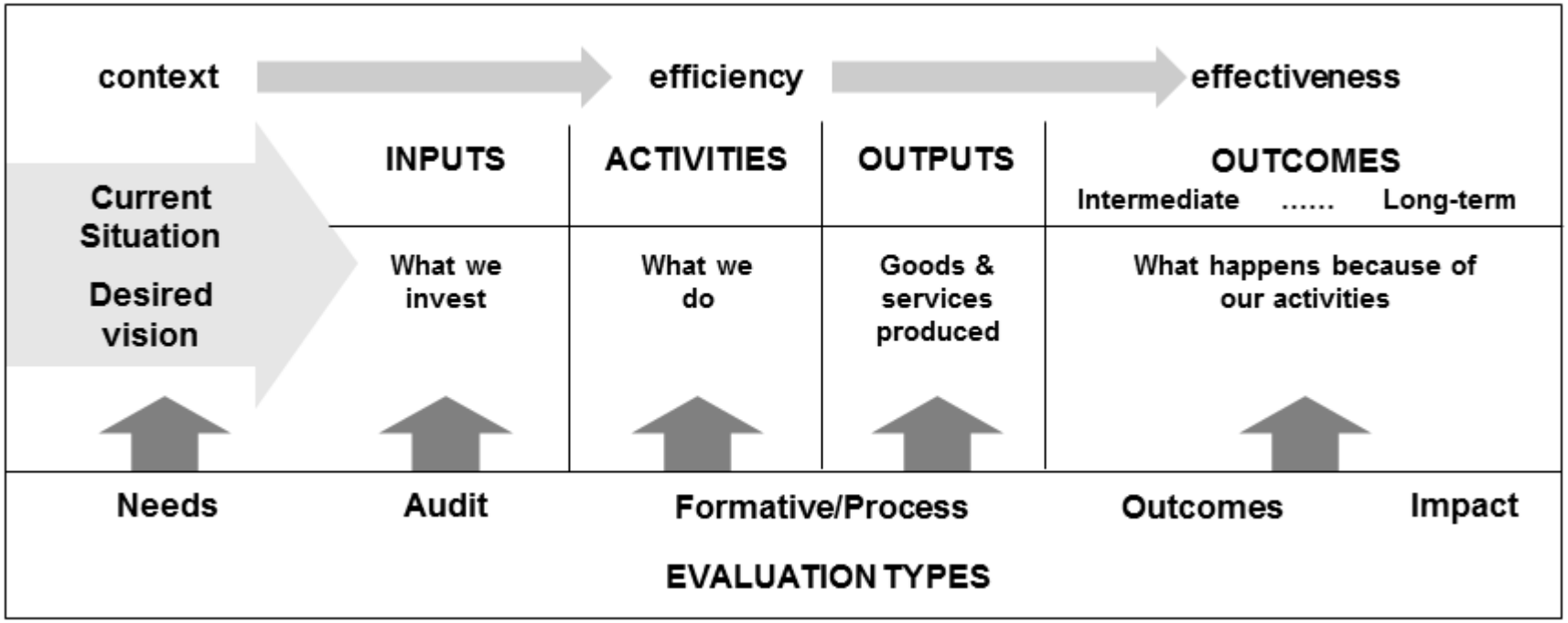
DSS development using a TOC methodology

- TOC is a project planning methodology focused on ultimate outcomes
- Requires identification of activities, outputs, and short, medium and long-term outcomes
- Also provides framework for evaluation

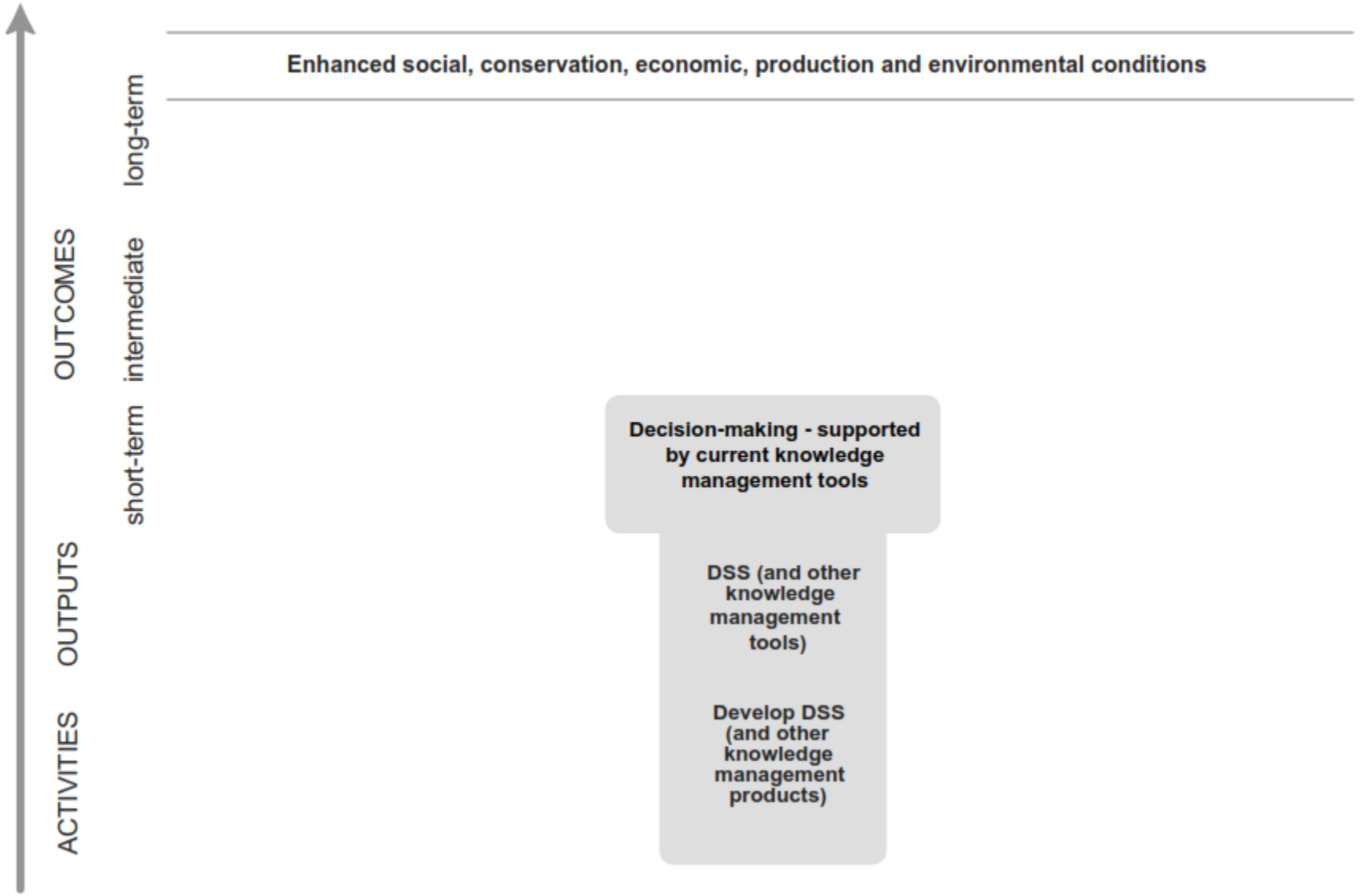
Must involve the stakeholders



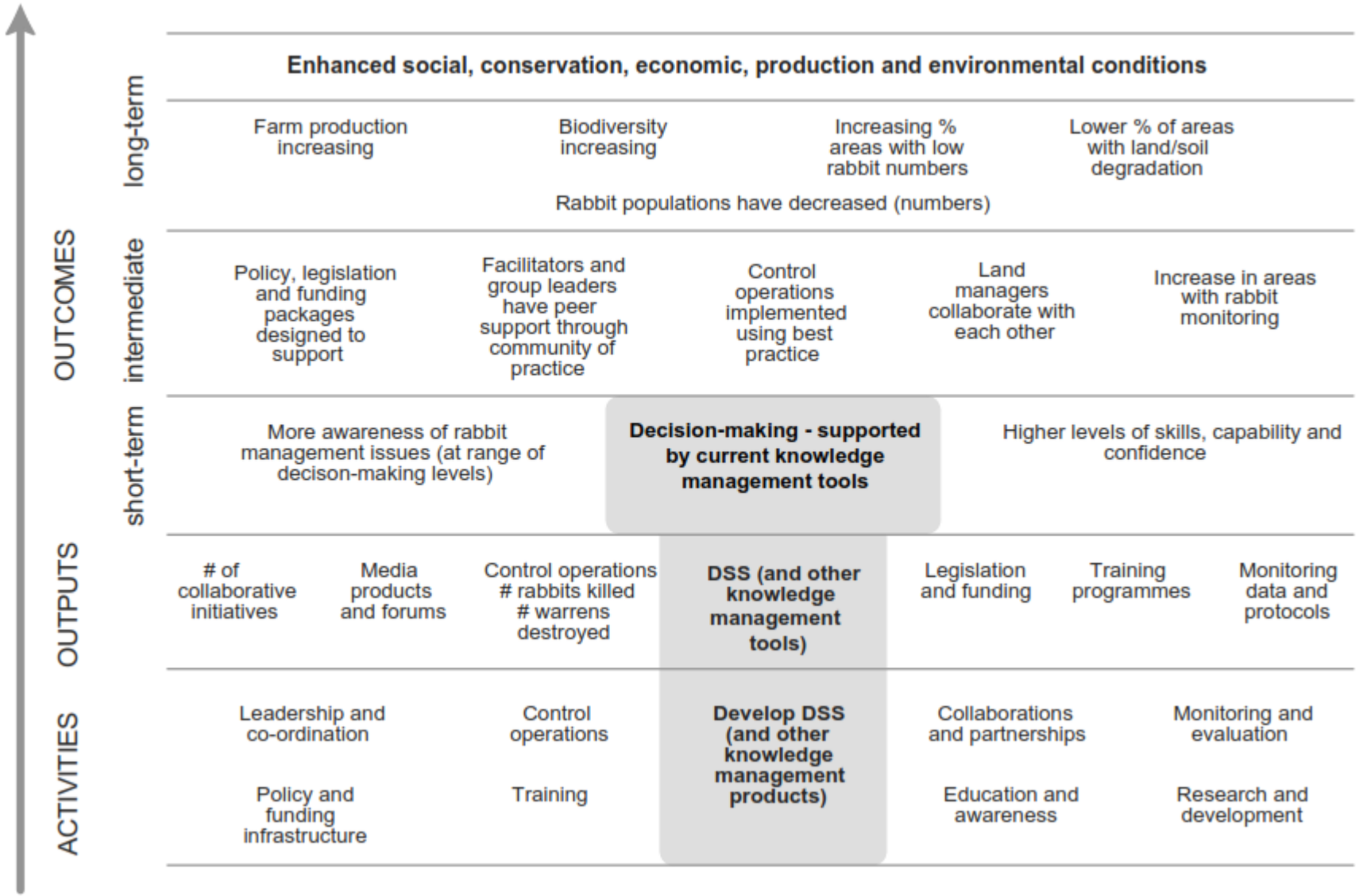
Theory of Change



Logic model…1

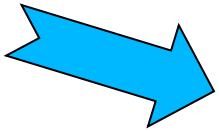


Logic model…2



Initial Conservation Land Decision Tree

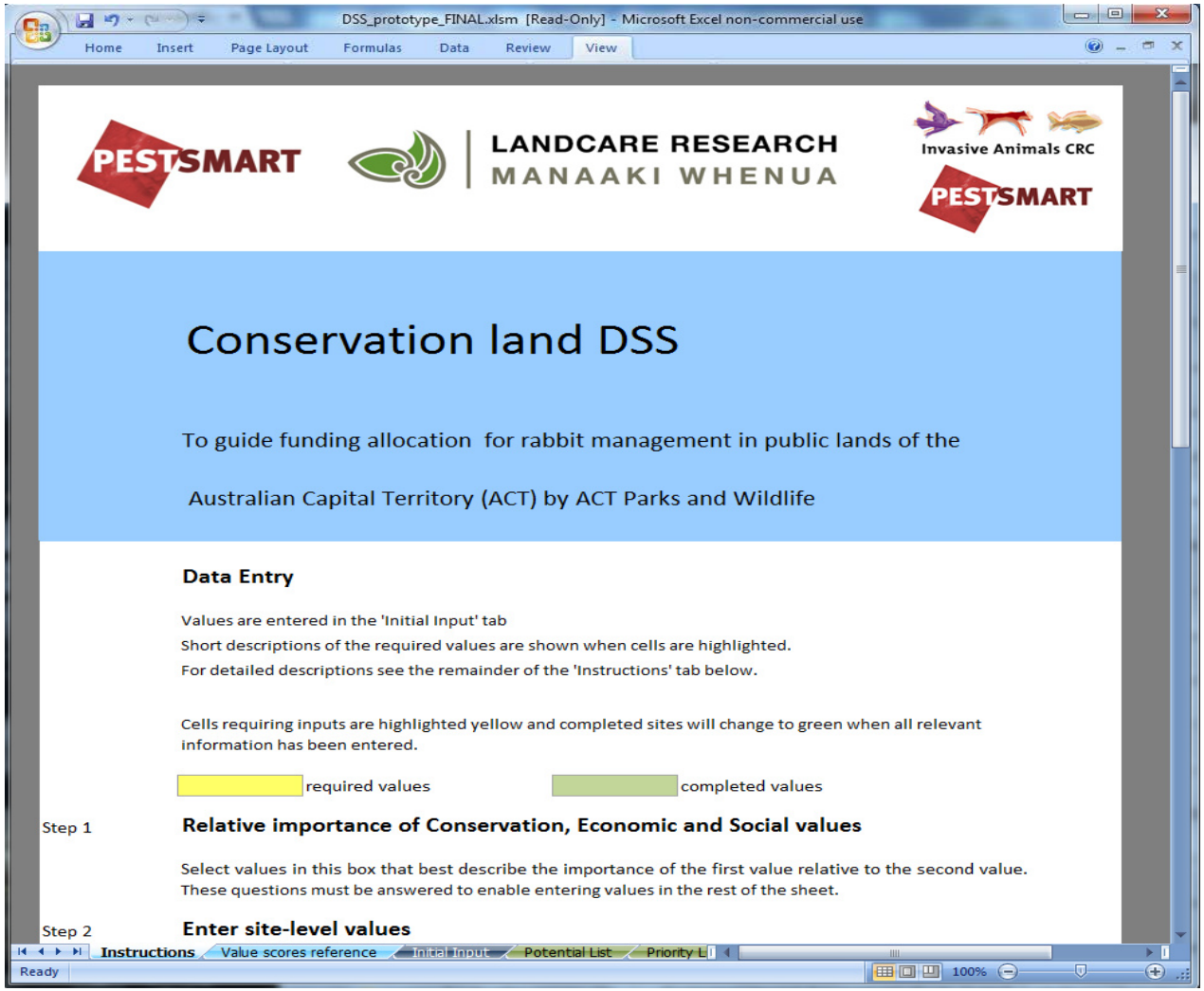
Vertebrate Pest Coordinator



Conservation scores

Rapid assessment

Conservation land DSS



http://www.pestsmart.org.au/pest-animal-species/european-rabbit/dss-for-rabbit-management/

Production land DSS

Farmers, sheep and rabbits – NSW Tablelands

Production land DSS model

- Grass production is driven by rainfall
- Rabbit abundance is driven by pasture biomass
- Wool production is driven by available pasture biomass as affected by rabbit abundance
- These relationships developed by Choquenot 1998 (11th Australian Vertebrate Pest Conference‘)
- These relationships re-modelled in R and made internet available using Shiny

Production land DSS Farmers, sheep and rabbits

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Rabbit control DSS | Introduction | Inputs | About

Introduction

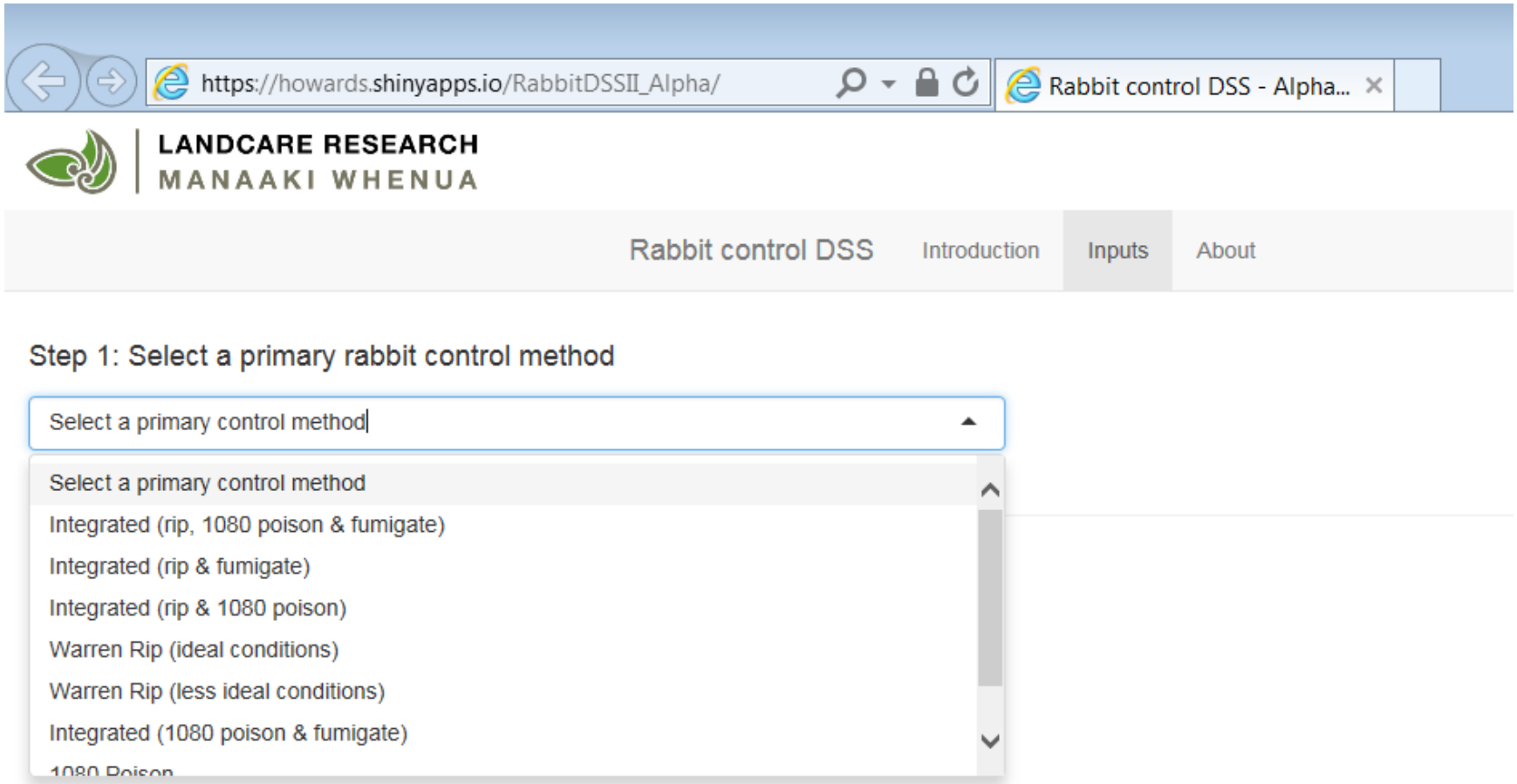
This Decision Support System (DSS) is a learning tool that demonstrates the potential cost-benefits of rabbit control under alternative scenarios, encouraging best practice rabbit control. It allows users to vary pre-set control and on-farm inputs to simulate rabbit populations and sheep grazing systems. The main outputs are estimates of wool production cost-benefits of the chosen rabbit control strategy versus undertaking no rabbit control.

Temperate grasslands

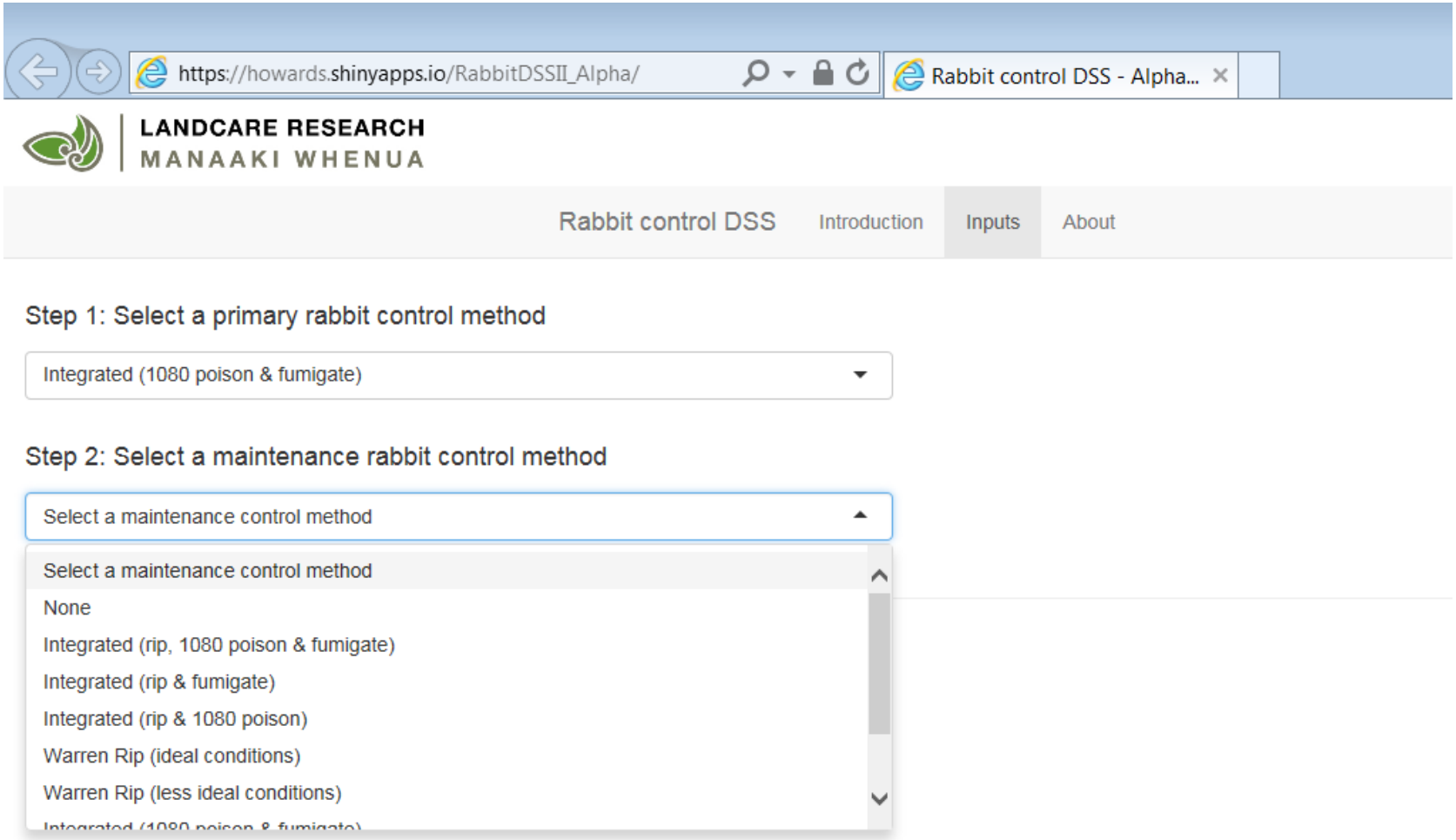
The DSS is based on an ecological model developed by Choquenot (1998). This model was used for a previous (currently unused) DSS developed by the Centre for Agricultural & Regional Economics Pty Ltd (CARE) for the Bureau of Rural Sciences. The model uses data collected from rabbit control trials at multiple wool production farms in the Centre Tablelands region of NSW over a three year period (Choquenot 1998). The data were used to develop a seasonal herbivore-resource model in which rabbits and sheep interact through shared pasture biomass.

Produced by NSW Local Land Services

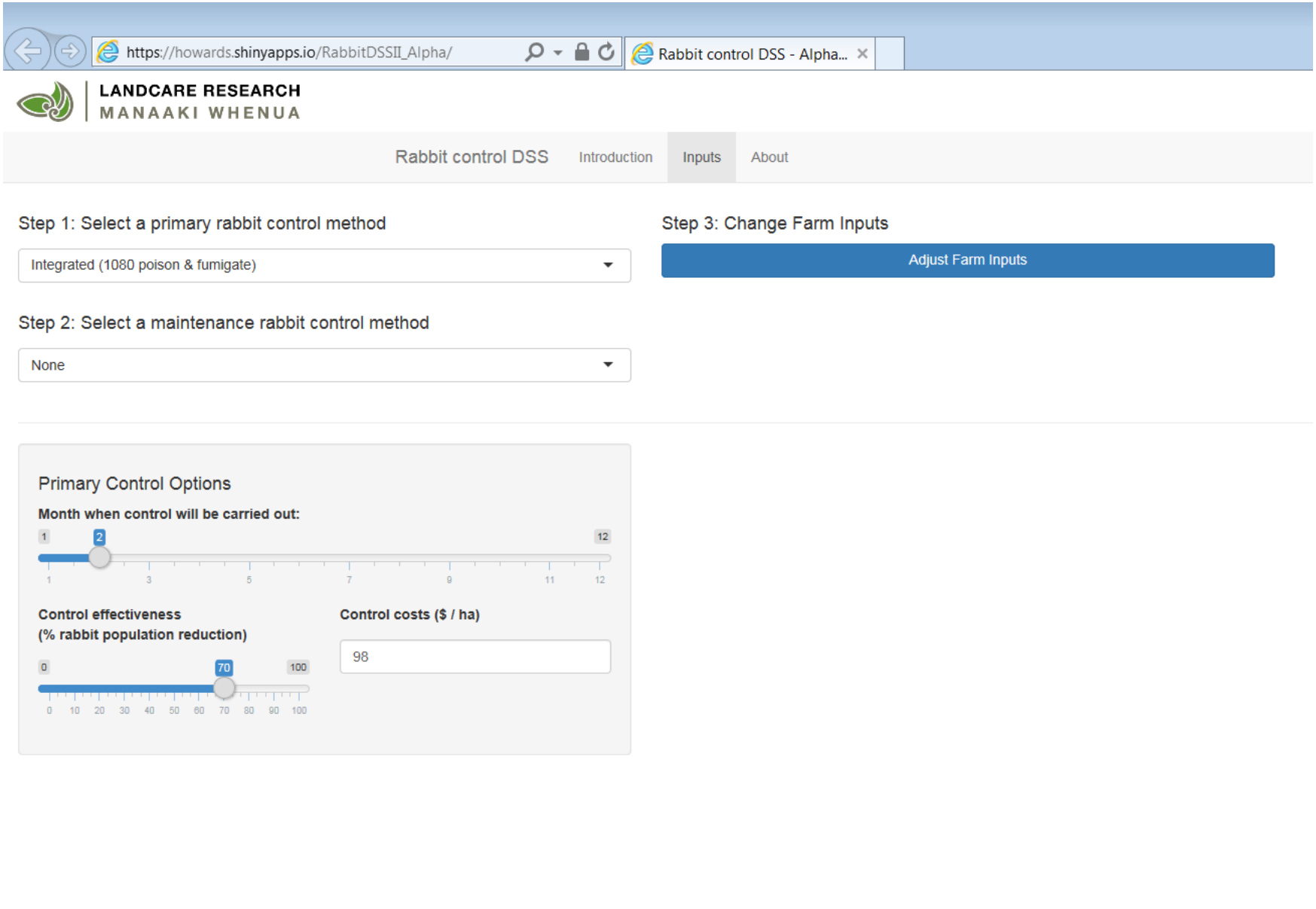
Production land DSS – Inputs…1



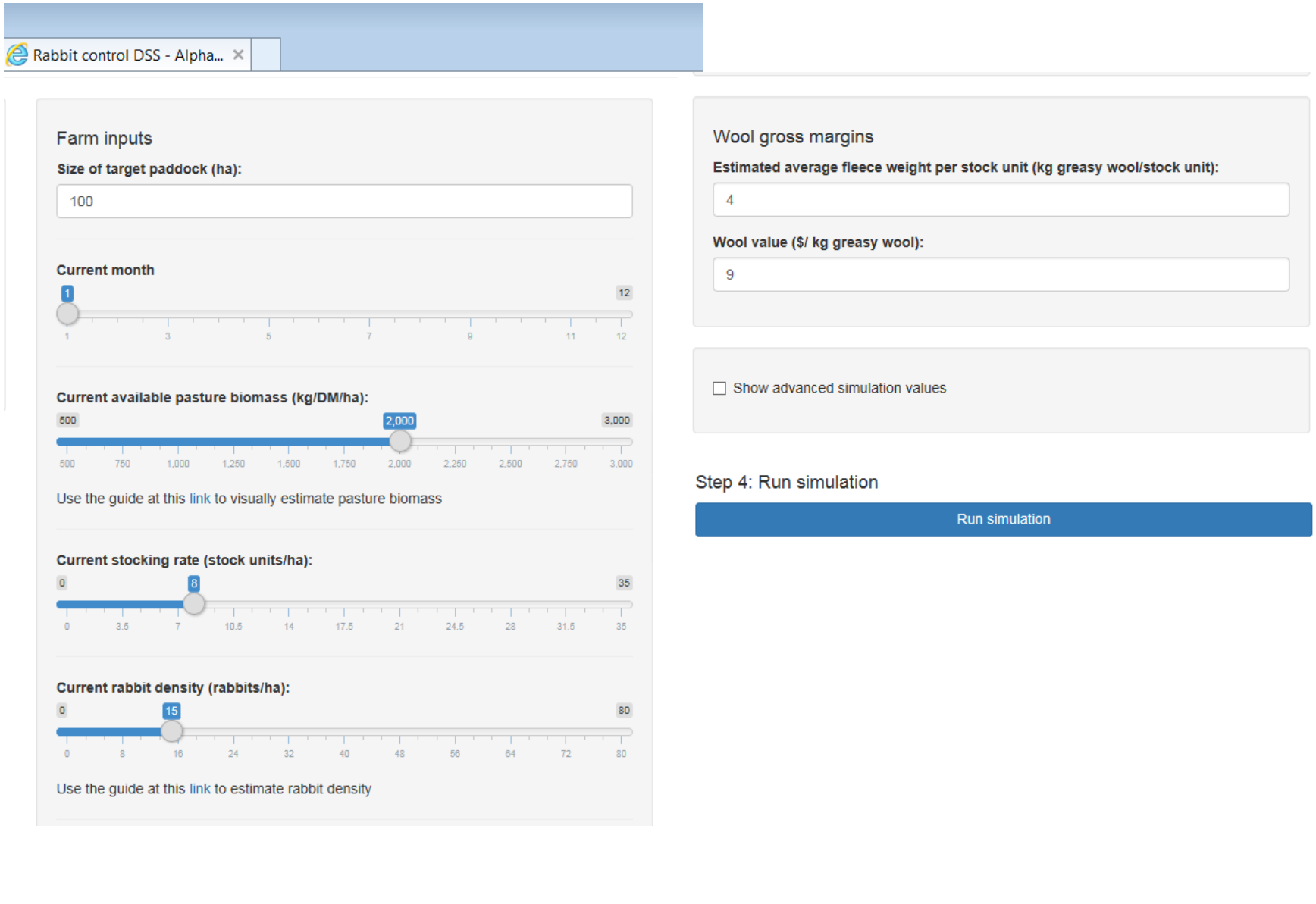
Production land DSS – Inputs…2



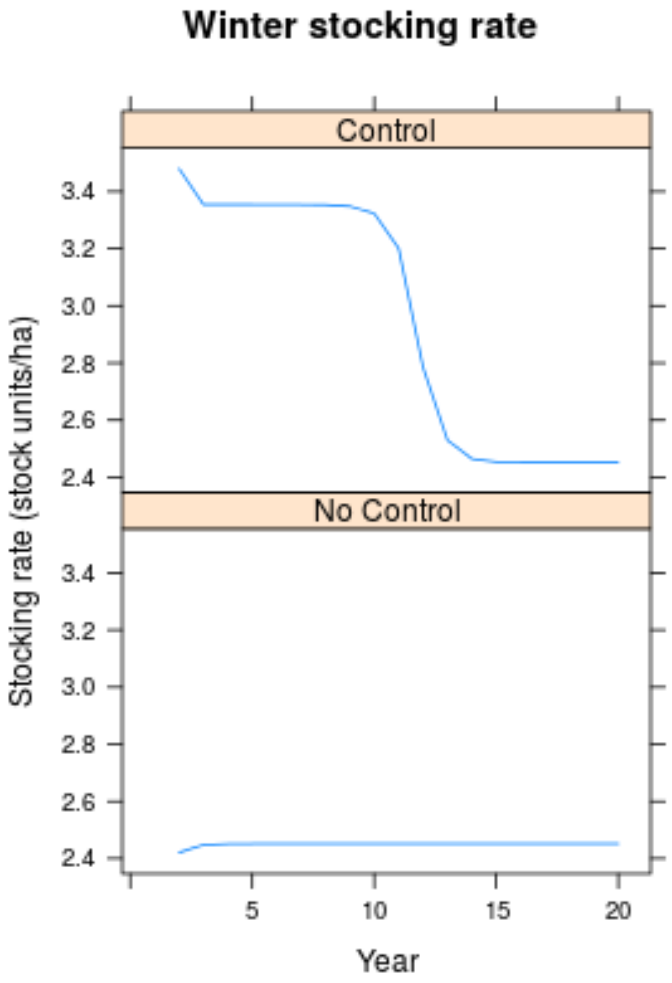
Production land DSS – Inputs...3

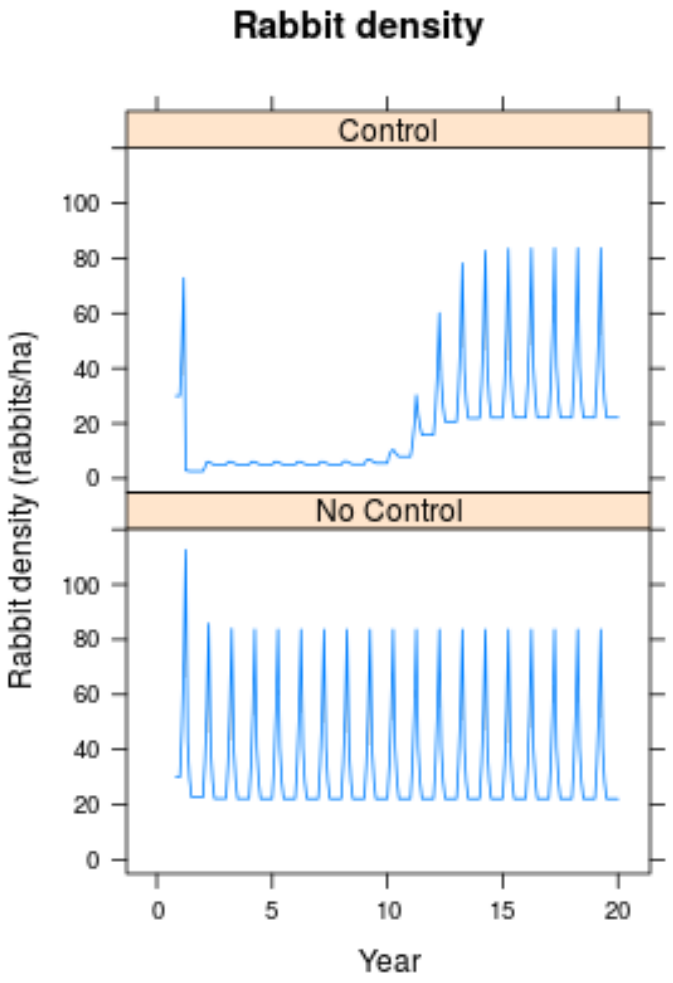


Production land DSS – Inputs...4



Production land DSS – Outputs…1





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Production land DSS – Outputs…2

Output table | Output plots | Inputs summary (delete for final version) | Development plots (delete for final version)

Economic Summary Table

	No Control	With Control	Impact of control
Average winter stocking rate (stock units / winter)	245.00	294.60	49.60
Average wool cut (kg greasy wool sheared / year)	980.02	1178.38	198.36
Average wool income ($ / year)	8820.18	10605.44	1785.26
Average control cost ($ / year)	0.00	-596.50	-596.50
Gross margin ($ / year)	8820.18	10008.94	1188.76

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Conclusions

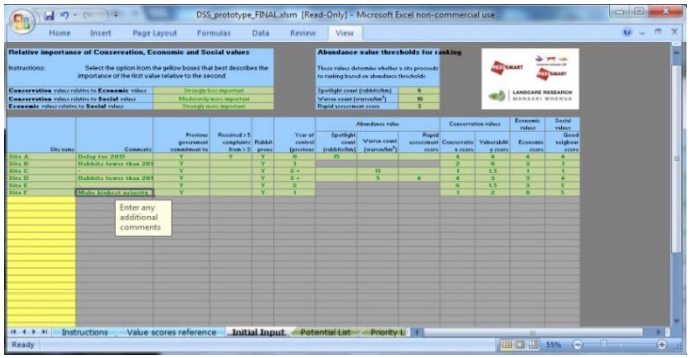
How do we make DSSs effective?

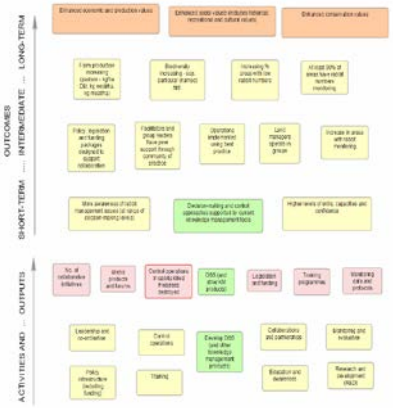
1. Involve stakeholders throughout planning, development, and implementation stages
2. Provide the end-user with:

DSS

AND

TOC or logic model





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Acknowledgements

- Invasive Animal CRC for funding
- Oliver Orgill (Parks and Conservation Services, ACT) for providing his decision framework
- Brent Glentworth (Environment Canterbury) for NZ's rapid rabbit abundance assessment method
- All stakeholders who participated in workshops