Tackling tree decline with graziers in Australia's sheep-wheat belt

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on behalf of

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THE AUSTRALIAN NATIONAL UNIVERSITY

Australian Government
Department of the Environment, Water, Heritage and the Arts

Australian Government
Australian Research Council

currently

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DALHOUSIE UNIVERSITY
Inspiring Minds

The southeastern Australian sheep-wheat belt

Tree decline

It's a really good exercise to look out over this country. Everywhere that you see a single tree, envisage that in 50 years time it will be gone. Everywhere that you see a group of trees, well, these will probably be single trees.

(Landholder 7, Photo 12_23_22)

Causes of tree decline

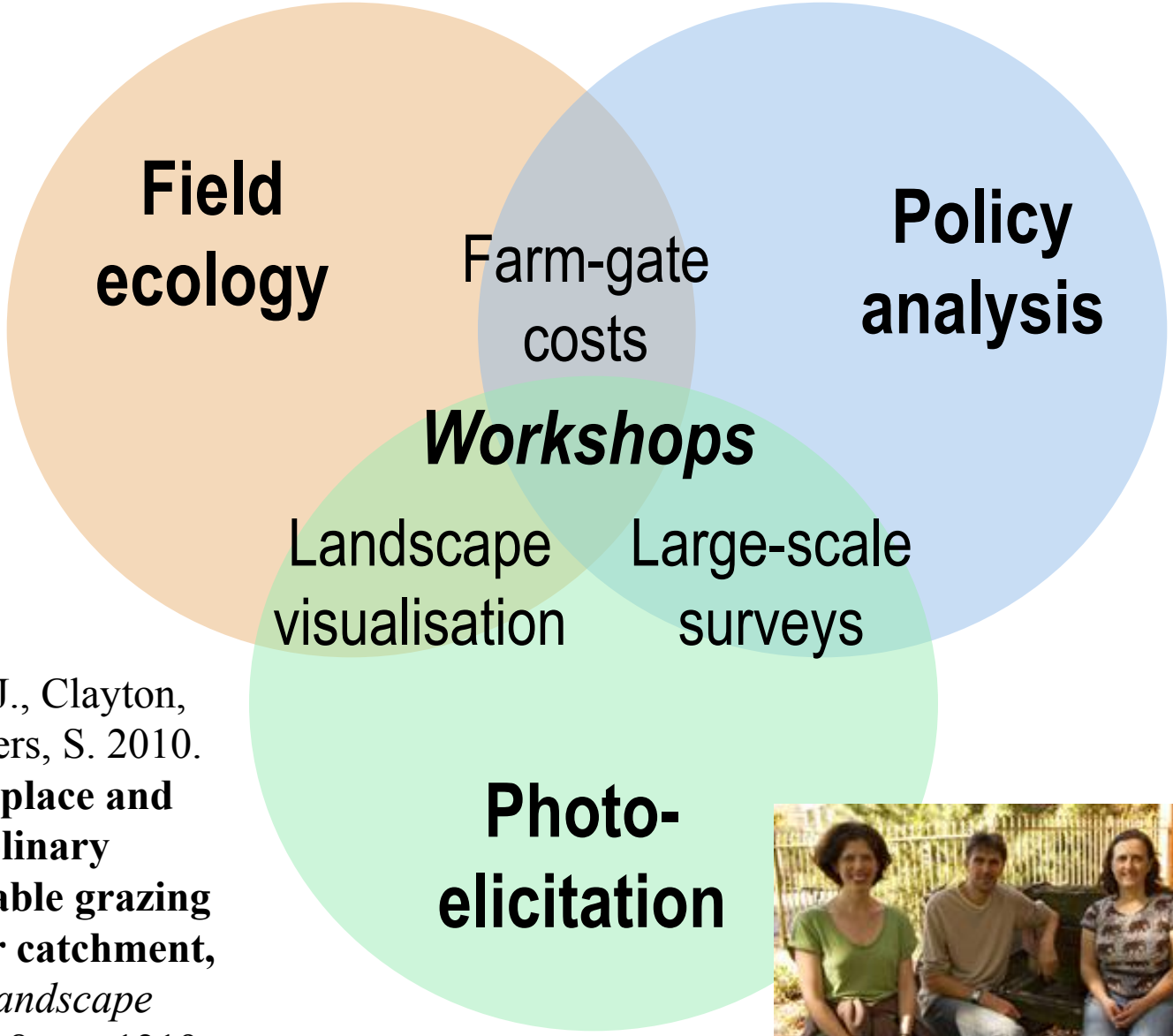
1. Natural senescence in old trees.
2. Lack of regeneration.
   - Few parent trees around
   - Native seedlings can't compete with exotic pastures
   - Native seedlings fare poorly in high nutrient environments
   - Eaten/trampled by stock if grazed continuously

Research aims

1. Establish the pace and drivers of tree decline;
2. Understand its impacts on local graziers;
3. Identify some viable options for reversing it.

Are there win-wins?

Methods



Sherren, K., Fischer, J., Clayton, H., Schirmer, J., Dovers, S. 2010. **Integration by case, place and process: Transdisciplinary research for sustainable grazing in the Lachlan River catchment, New South Wales.** *Landscape Ecology*, Vol. 25, No. 8, pp. 1219-1230.

Stakeholder engagement

1. **Research enablers,** volunteering their properties for ecological study;
2. **Research subjects** in photo-elicitation, interviews about farm finance, and landscape visualisation;
3. **Research collaborators** in the interpretation and examination of preliminary results, during annual workshops; and,
4. **Focus group members** for testing our final outreach and extension work.

Methods

Field ecology (*n*=31)

Farm-gate Costs (n=11)

Policy analysis

Workshops (n=22)

Landscape visualisation (n=4)

Large-scale surveys

Photo-elicitation (*n*=25)

Stakeholder workshops

Funding ran February 2008 to end 2010

1. **May 2008**, first workshop
   - Set research priorities
   - Mix of graziers (covered fuel costs), catchment /local government, ENGO
2. **June 2009**, second workshop
   - Interpret early findings (ecology, first survey, photo-elicitation)
   - Mix of graziers (covered all costs), ENGO, federal government
3. **June 2010**, third and final workshop
   - To interpret later findings (scenario landscape visualisation, second survey, economic analysis)
   - Mostly graziers; paid time and all costs.

Landscape visualisation

We hoped to use ecological models and photo-realistic landscape simulation to:

1. Establish and communicate the pace of tree decline; and,
2. Identify some potential management options.

We did so using landscapes graziers had themselves identified as significant during photo-elicitation

The policy context

1. Current incentives to **protect** trees target large patches.

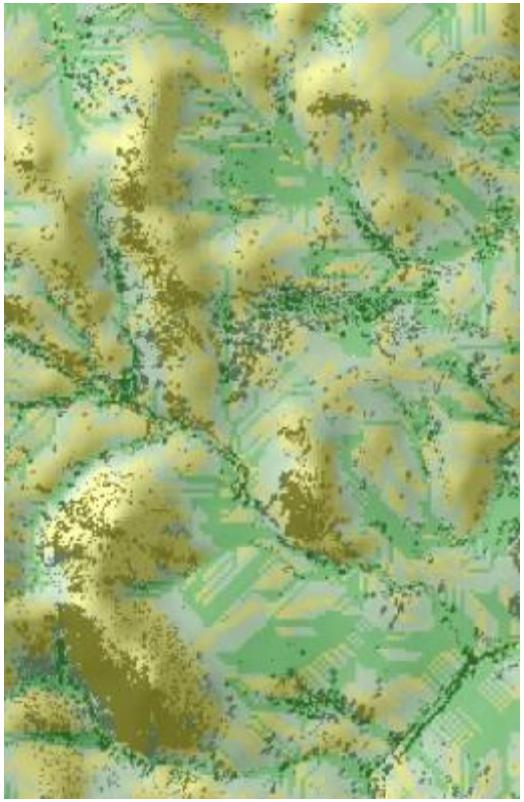
2. Current incentives to **plant** trees encourage long strips along fences and rivers.

Simulation at year 0 25 50 100

Original photo

Particular concern for scattered trees

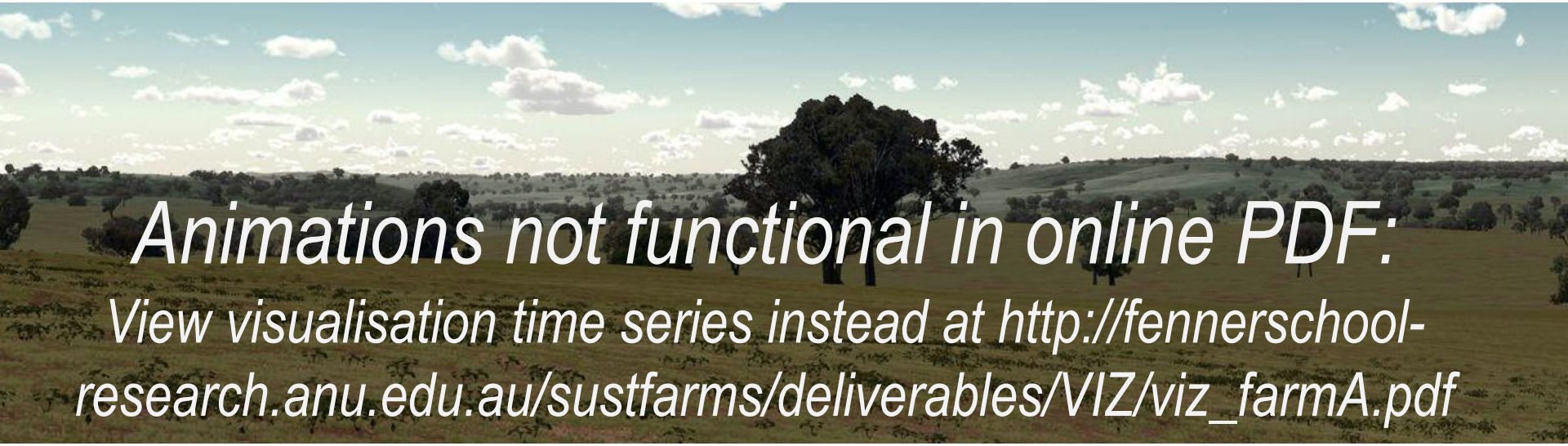
- No incentives to plant or protect isolated and scattered trees.
- Individually disproportionately valuable for many ecosystem goods and services.
  - Animal habitat (inc. threatened)
  - Stock protection
  - Emotional well-being of farmers
- They are the most prevalent tree arrangement in the productive areas suffering tree decline.



Remediation by planting

1. Plant scattered trees
   - 1 per acre in areas of low tree density
   - Protect with individual tree guards until viable
   - Direct cost of $40 per planted hectare

2. Densely seed poor paddocks
   - Seed strips along the contour
   - Exclude livestock until viable
   - Direct cost of $440 per hectare; (Production losses of $660)



Scattered planting 25 50 100

Dense seeding 25 50 100

Remediation by grazing

1. High-intensity short-duration rotational grazing
   - Simulating large-herbivore migrations
   - Allowing recovery time for pasture
   - Transition costs of $75 per hectare for fences and water points
2. Dramatically reduce chemical fertilisers
   - Involves a conversion to native, usually perennial, pastures
   - Avoids outcompeting seedlings through nutrients or exotics
   - Reduces carbon footprint (fertiliser, tilling) and direct costs

- BUT WE COULD NOT MODEL THESE SPATIALLY

Conclusions

1. It is difficult to get a representative set of participants for workshops; we managed to only by paying for their time as well as their costs
2. Visualisation is an effective and powerful means of engaging stakeholders, must be done even-handedly
3. Co-engagement in research means not sugar-coating negative messages if they are genuine outcomes
4. Happily, the project leaves behind a local community of interest around scattered tree decline.
    - Participation in schools activities using our curriculum materials
    - Circulation of our extension materials by catchment agencies

Sherren, K., Fischer, J., Clayton, H., Hauldren, A., Dovers, S., in press. **Lessons from visualising the landscape and habitat implications of tree decline - and its remediation through tree planting - in Australia's grazing landscapes**, *Landscape and Urban Planning*.

Please visit the ***Sustainable Farms*** website

http://research-fennerschool.anu.edu.au/sustfarms

View our **YouTube video** of scenario modelling at:

http://www.youtube.com/watch?v=gVojTsvmmKU

Thank you for listening