Manaaki Whenua
Landcare Research

Barriers and opportunities for planting native trees on farms

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Motivation

- Afforestation is an important part of NZ's strategy for climate change mitigation
- Strategies to promote afforestation include voluntary approaches such as incentive programmes
- We have a good understanding of the land suitability and factors driving afforestation for production forestry
- There is a limited knowledge of
  - Barriers to plant native trees on farms
  - Factors influencing rural landholders to plant native trees

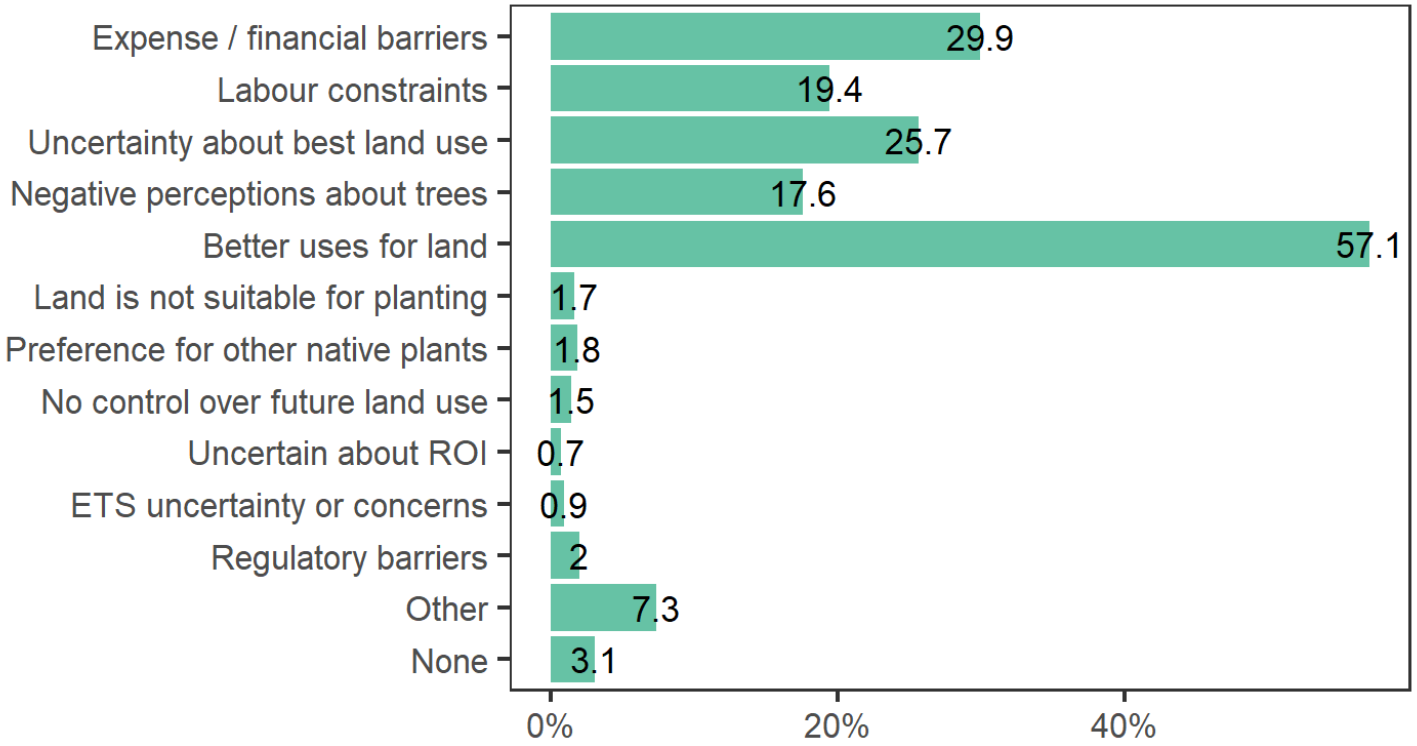
System barriers - Māori

- Permanent alteration of Māori land
- Logistics of getting multiple owners to meet and/or agree to changes
- Difficulty in securing financing through regular banking channels
- GHG / Carbon sequestration doesn't fit with Te Ao Māori

System barriers - General

- Biophysical:
  - Some areas may simply not be suitable for native trees
  - Increasing frequency of storms and/or pest infestations
- Social and regulatory barriers
  - Community perceptions of forests and forestry
  - Lack of Acts and policies specifically aimed at the use of natives
- Lack of information on growing native trees, especially around Carbon storage
  - Single entry for native trees in the ETS lookup tables
  - Carbon models for native trees are unreliable
- Lack of ‘wrap around’ support for growing natives

Reason for not planting more trees in the next 2 years



Source: Survey of Rural Decision Makers 2019, Manaaki Whenua Landcare Research

Nursery barriers

- Ability for nurseries to upscale
- Forward orders
- Lag time of 1-4 years to get a plantable native tree from seed
- Most increase in native nursery growth has been in shrubs, grasses and flax for riparian planting

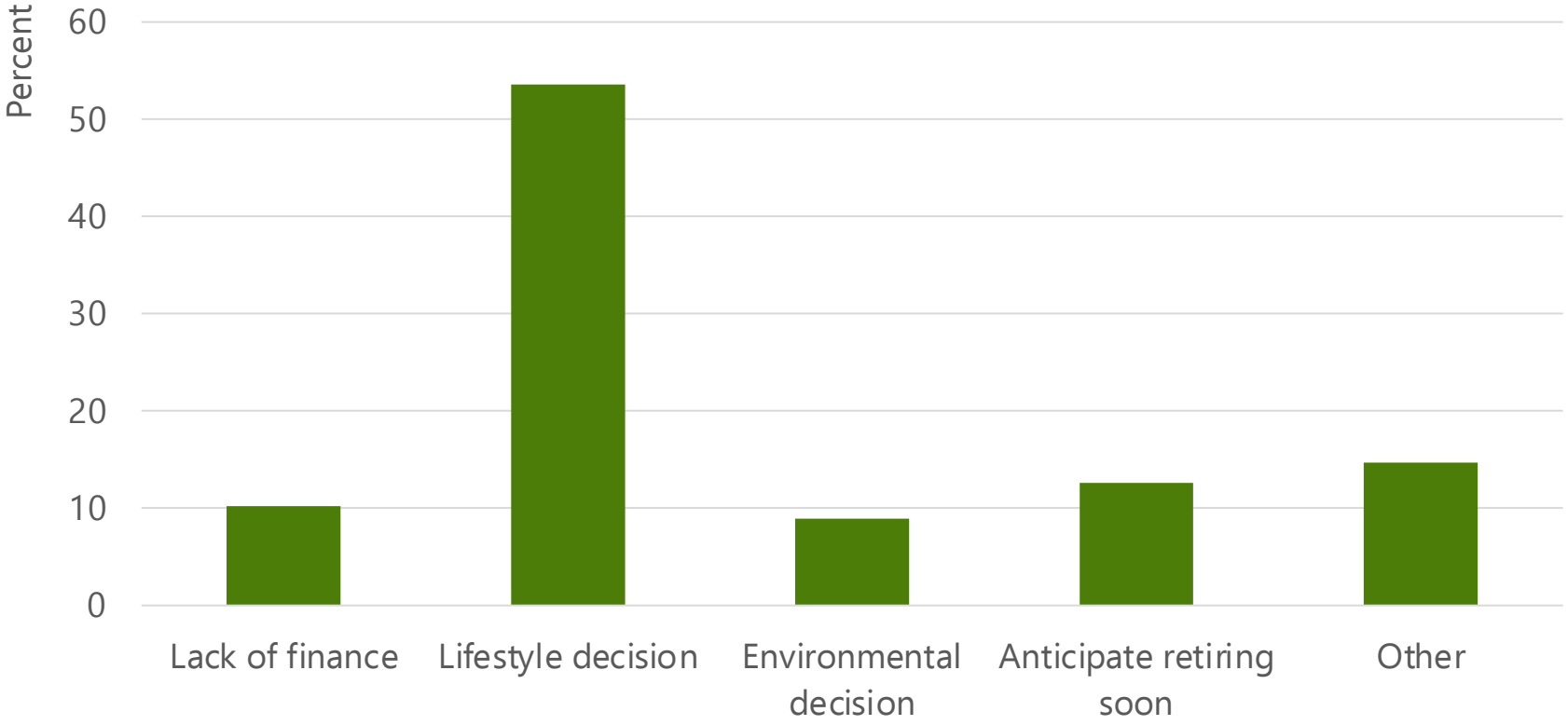
Financial barriers

- Missing information around the costs, benefits and relative value to other systems
- Cost of transforming from exotic to native trees incurs significant liability at the international level
- Costs to change back to farming from forestry
- Transaction costs
- Access to capital for investment
- Extremely high costs associated with establishing native forests on marginal land (CCC)
- Timespan for ROI – for native established forests can be up to 70 years (15 for regenerated forest)

Labour and individual barriers

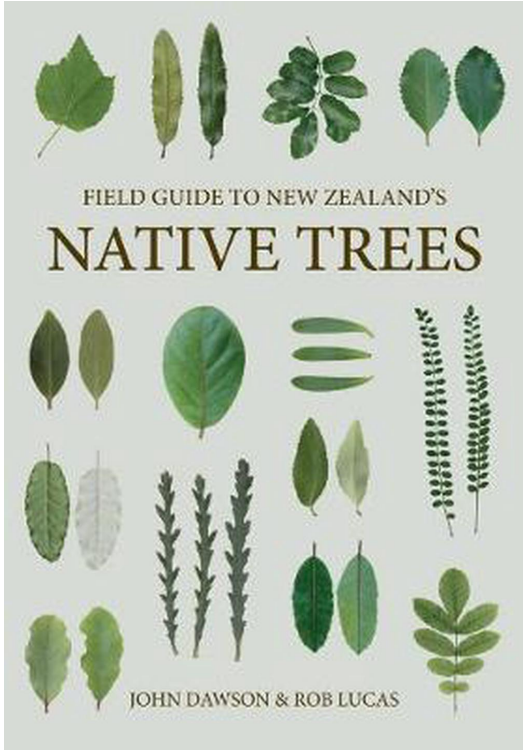
- Skills deficits of landholders to run new, native forest systems
- Lack of skilled workforce available to maintain native forest systems
- Tensions with communities around workforce
- Individual contexts and situations play heavily into decisions around changing land use

Primary reason for not changing land use



Native tree information

- Focus has been on establishing new forests. Enrichment restoration is critical and often overlooked
- Limited knowledge on the establishment of native forests,
  uncertainties around markets, cash flow, carbon and co-benefits
- Existing interest in planting natives for aesthetic and amenity purposes, emerging interest in wood production
  and carbon sequestration.



Opportunities

- Research into growth and management of native trees and development of carbon accumulation models for them
- Understanding the growth of small patches of native (and exotic) trees. Many trees are in e.g. shelterbelts
- Changing narratives around (native) trees on farms
- Taking advantage of Regional Council and/or catchment groups to facilitate sourcing, planting and maintaining seedlings
- Create certainty around future nursery orders
- Where nurseries are unable to scale up native tree production, can we turn every back yard into a native tree nursery?
- It may be that the smallest nurseries could focus solely on native plants
- Training/upskilling for landholders and their staff in planning, establishing and managing novel enterprises around native forests

Financial opportunities

- Ecosystem services, including fuelwood, medicine, food and other products and services not captured by the market
- Standardised way of counting planting and maintenance costs
- Innovative financing mechanisms
- Simplification of application process
- Provision of indirect financial assistance through e.g. bulk purchases of seedlings
- Reduce long-term costs through working with Regional Councils or other Government Departments

Aims of a choice experiment study

- Quantify trade-offs among various elements of incentive programmes to encourage native afforestation and regeneration
- Investigate other factors that affect participation in native forest establishment programmes on private lands
- Analyse both participation and the area of land the landholders would commit to native forest establishment

Programme Elements	Programme A
Type of native forest establishment	☒ **Reversion or regeneration** ☐ Afforestation (planting)
Planning and choosing native species	☒ **You source information** ☐ Government provides advice
Labour for establishment and maintenance	☐ You find labour ☒ **Government finds labour**
Supply of seedlings	☐ You source seedlings ☐ Government finds a supplier ☒ **Government provides seedlings**
Completing applications paperwork	☐ You are responsible ☒ **Government helps fill out**
One-off grant, $ per hectare	$3,000

Would you enrol in this Programme?

Yes

No

What area (in hectares) would you commit to this Programme?

Choice experiment

- Framed as a native forest establishment programme
- Questions had two options (participate or not)
- Each respondent received 8 questions
- If they answered “Yes”, we asked what area would they enrol

Survey implementation

- SRDM respondents that agreed to participate in follow-up surveys, property size >5ha
  - Dairy farmers
  - Sheep, beef, sheep and beef, other livestock = "Livestock" farmers
  - Lifestyle blocks owners
- Administered online survey in the end of June 2022
  - Sent 2,258 invitations
  - 609 usable responses

Method – hurdle negative binomial model

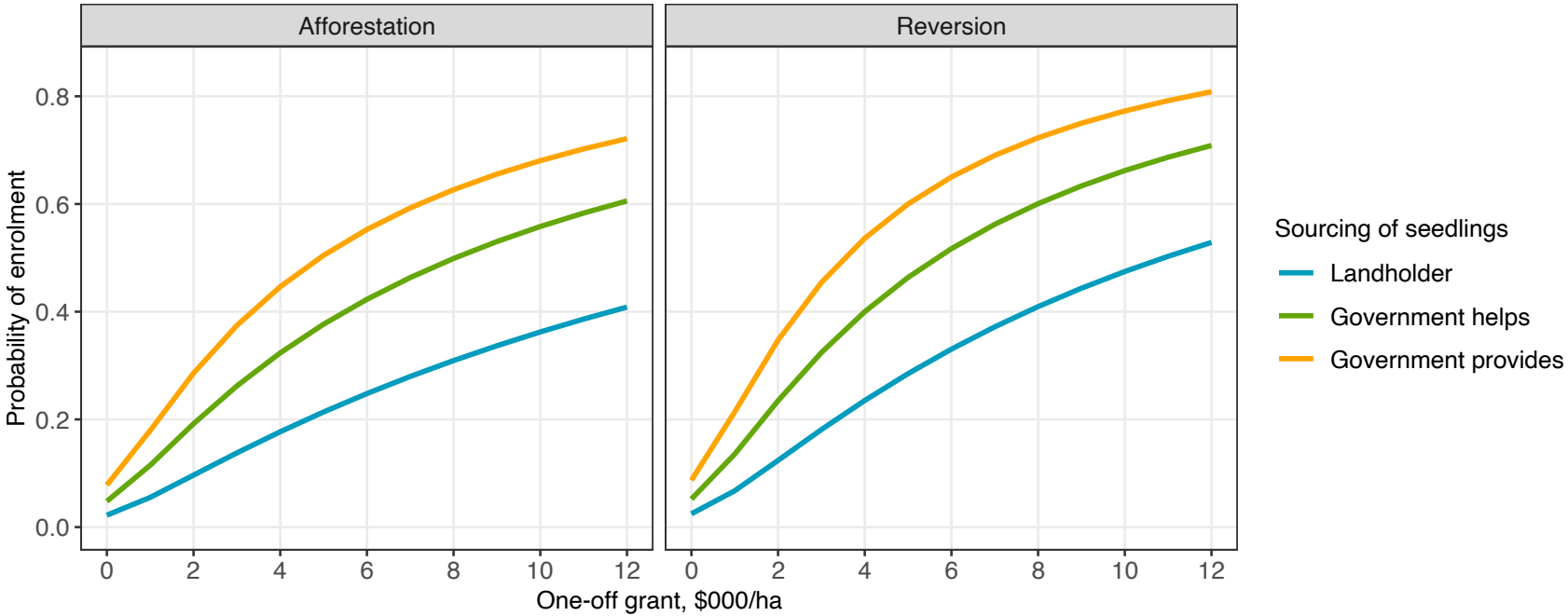
- We asked both whether respondent would participate and the area they would commit to the programmes
- We use a hurdle model, which models simultaneously
  - Decision whether or not to participate
  - If participate – decision what area to commit to the programme
- Decisions for afforestation and reversion are different
  - afforestation and reversion were modelled separately

Results – predicted effects

- Effect of changes in programmes' features (and properties characteristics) on
  - Probability to participate
  - Area committed to forest establishment
- The effects are estimated
  - For typical farm (377 ha, average topography, average %% of marginal lands)
  - For a programme that has average grant amount ($4,200) and no non-monetary benefits
- Predicted values for average farm

	Probability of participation	**Area committed conditional on participation, ha**
Afforestation/planting	17%	26.3
Reversion/regeneration	25%	8.8

Predicted probability of enrolment in native forest establishment by the type, grant amount, and assistance with sourcing seedlings



The predictions are for an average farm (377-ha farm on rolling hills, with average proportions of wetlands and other unused lands) and for a program without other non-monetary incentives

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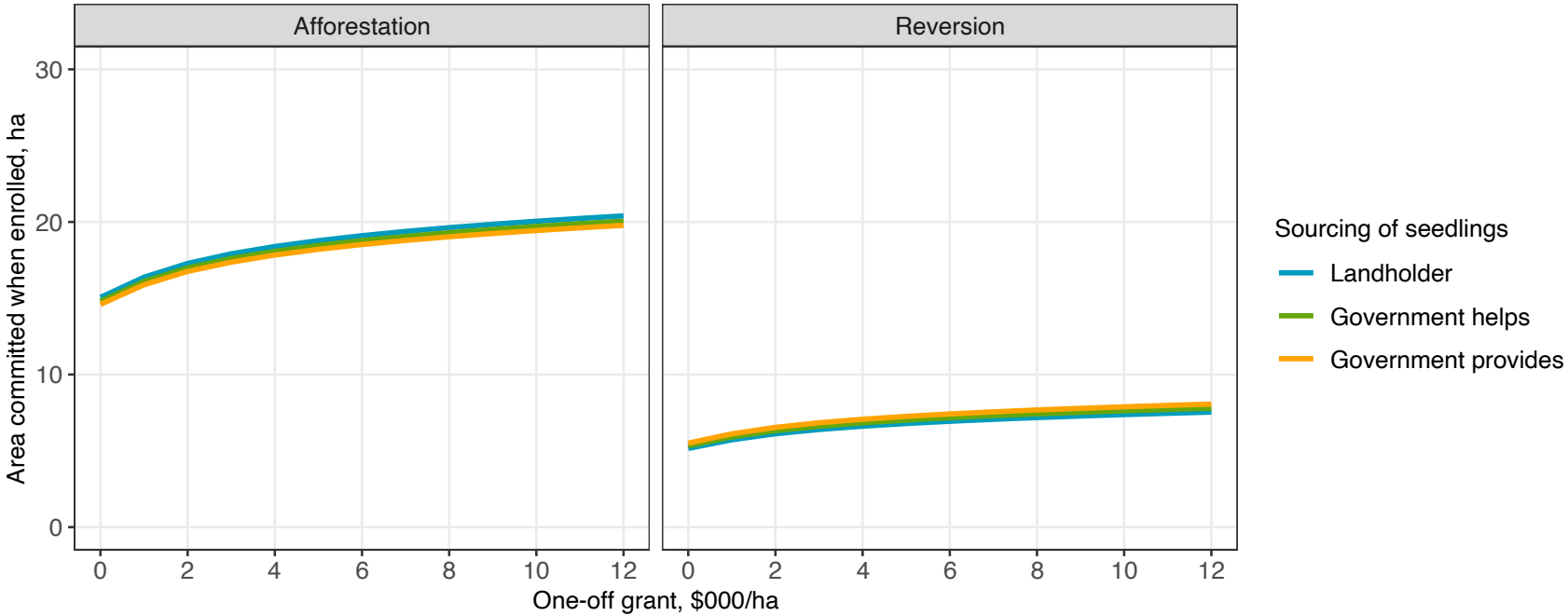

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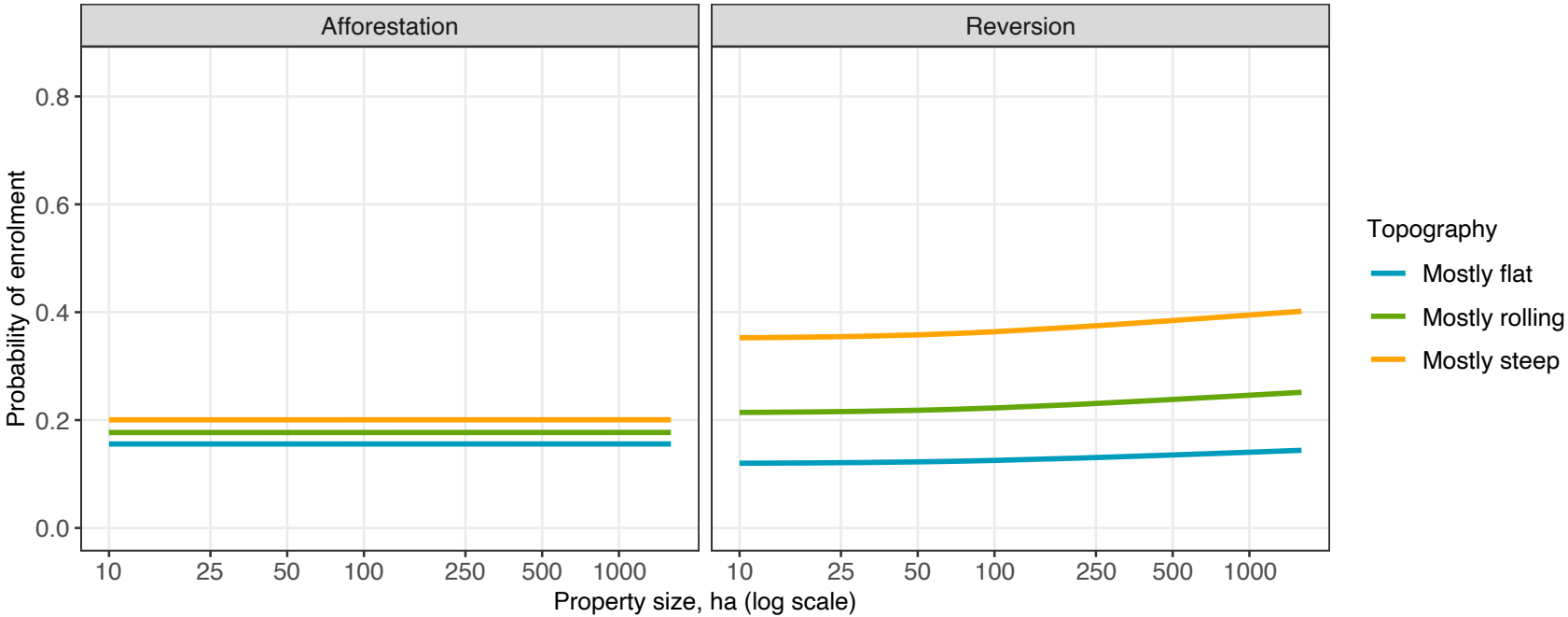
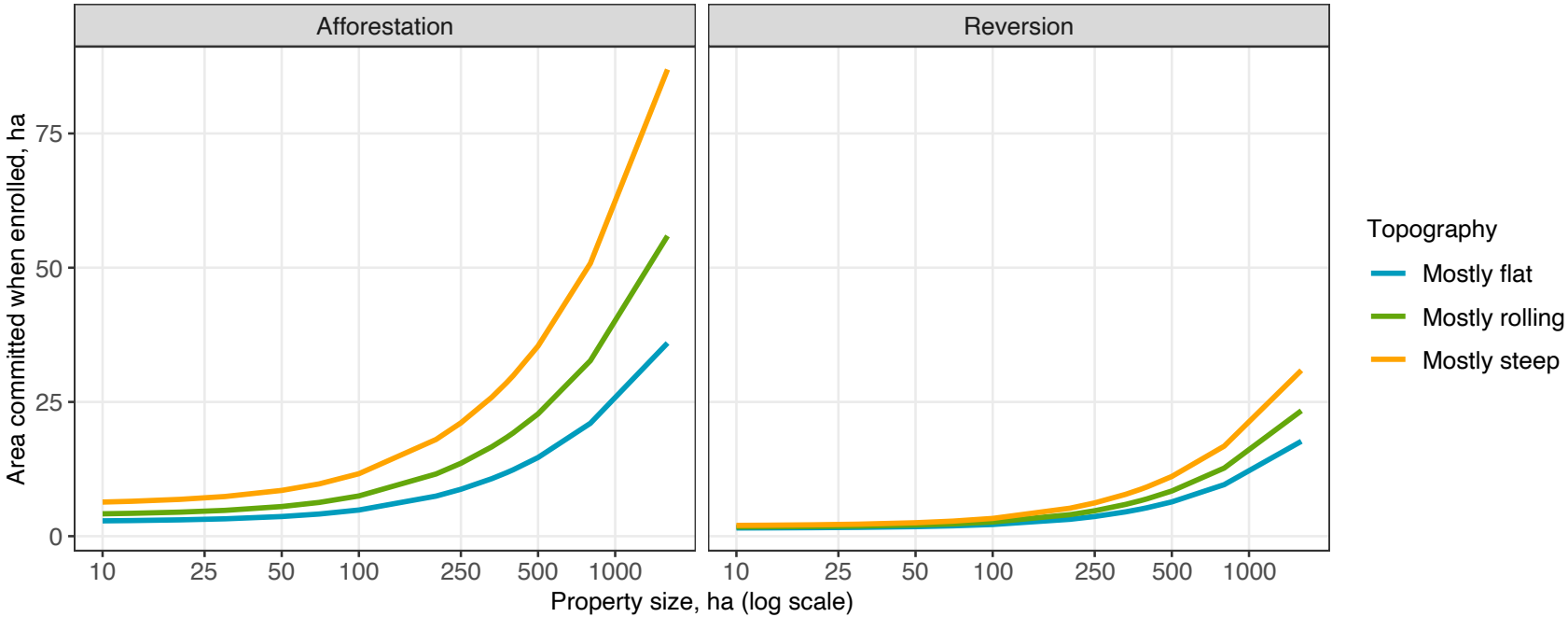
Predicted probability of enrolment in native forest establishment by type, farm size, and topography



The predictions are for a farm with average proportions of wetlands and other unused lands, for a programme with a $4,200/ha one-off grant and without other non-monetary incentives

Predicted area committed to native forest establishment by type, farm size, and topography



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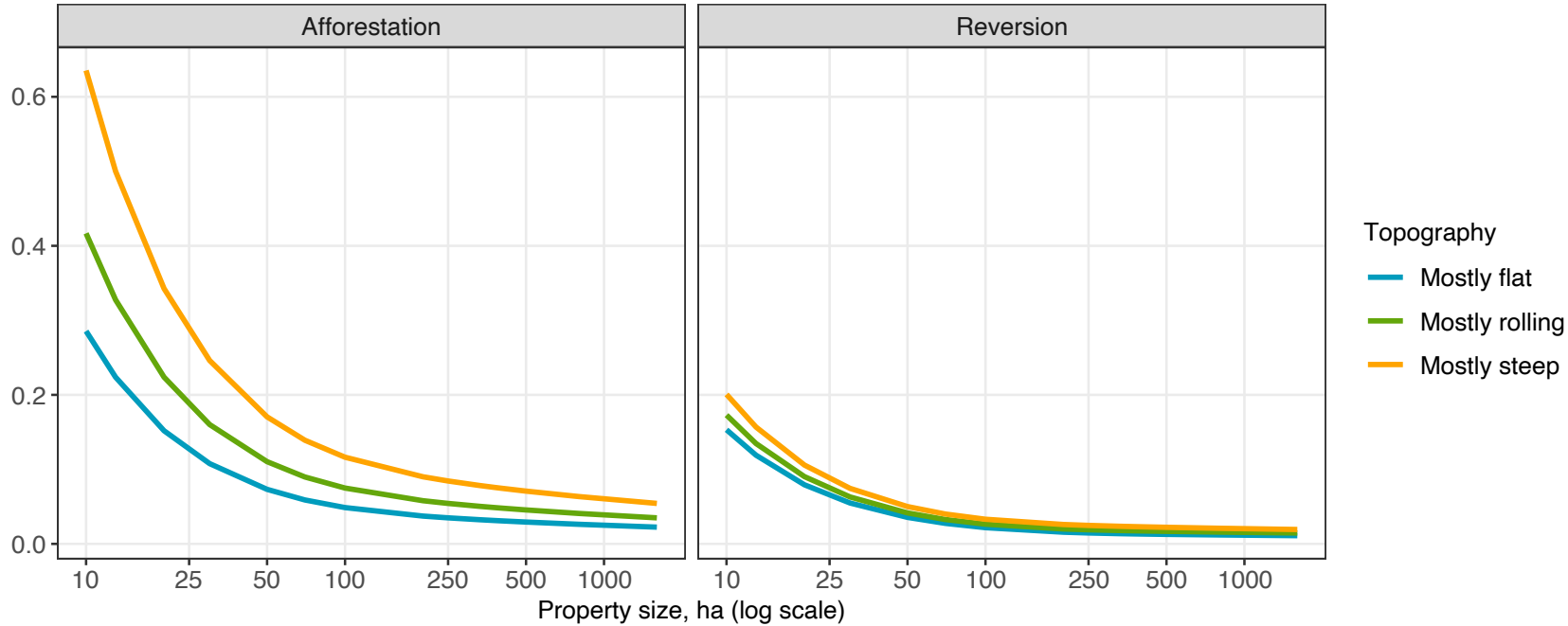
Predicted proportion of the farm committed to native forest establishment by type, farm size, and topography



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Conclusions 1. Incentives

- Monetary incentives are key to increasing enrolment and area commitment to both types of programmes
  - The magnitude of the impact of monetary incentives on the area committed to forest establishment is small
- Providing seedlings or finding seedlings suppliers are the most important non-monetary incentives to encourage enrolment
- Help with application and paperwork and with planning and species selection encourage enrolment in afforestation/planting programmes, but not reversion/regeneration programmes
- Help with finding labour does not encourage enrolment.

Conclusions 2. Features of the farm

- Property characteristics are important determinants of both enrolment and area commitment to the programmes
- The size of the properties does not affect enrolment but is an important determinant of the area committed
  - Holders of larger properties allocate smaller proportion to establishment of native forest
- Farms with steeper topography are more likely to be enrolled in the reversion/regeneration programmes, but topography has small impact on enrollment in afforestation/planting programmes
- The presence of wetlands is associated with a higher probability of enrolment and a larger area committed to both types of programmes

Ministry for Primary Industries
Manatū Ahu Matua

Thank you!