

Improving the economic and environmental performance of a New Zealand hill country pastoral catchment

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Context hill country pastoralism

- Low altitude steepplands
- Moist-temperate climate
- Moderately intensive pastoralism (sheep/beef)
- Landscape prone to erosion and weed reversion
- High density stream network
- Volatile commodity prices
- Environmental compliance pressure
- Declining rural labour force



Objective

To conduct a multi-stakeholder, participatory action research project to achieve a "well managed rural hill land farm system" in the context of stakeholder-defined goals

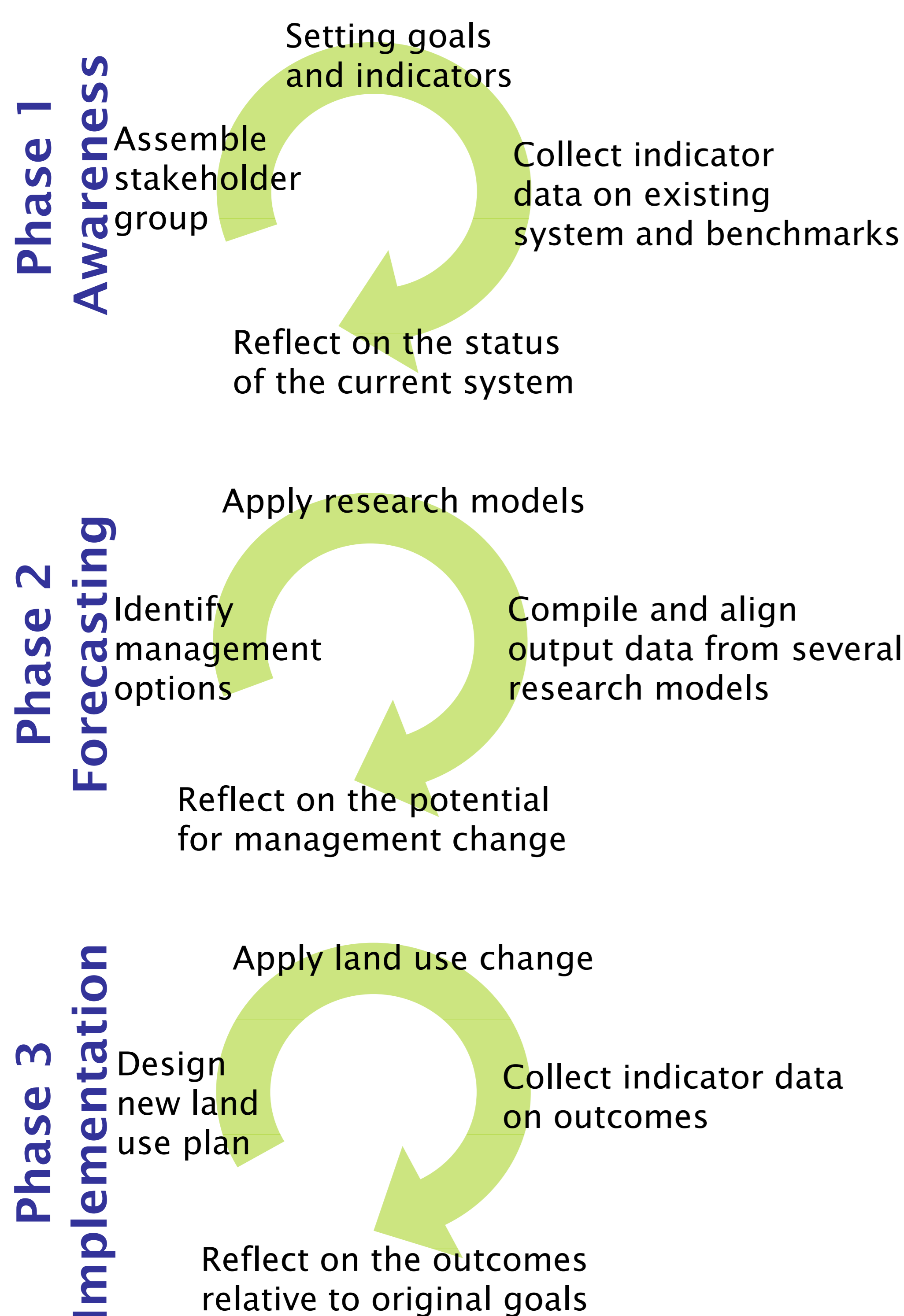
Stakeholder group

Farmers
Foresters
Local government
Regional government
Agricultural scientists
Environmental scientists
Conservationists
Maori



- Viable businesses
- Ecosystem health
- Protected landscape values
- Active partnerships
- Demonstrable environmental performance
- Adequate rural services and infrastructure

Process three loops of the learning cycle



Results from each phase

Phase 1 The existing system was failing to meet stakeholder goals from both economic and environmental perspectives (see indicator data table)

Why? A high proportion of erodible land with low pasture productivity, high maintenance costs (fertiliser, fencing, weed control), poor animal performance, low profitability, poor water quality, low diversity of aquatic faunal and terrestrial indigenous plant communities.

Phase 2 Research models (agroforestry, farm systems, catchment flow) predicted improvements in most economic and environmental indicators resulting from a range of altered stock policy and tree-planting options.

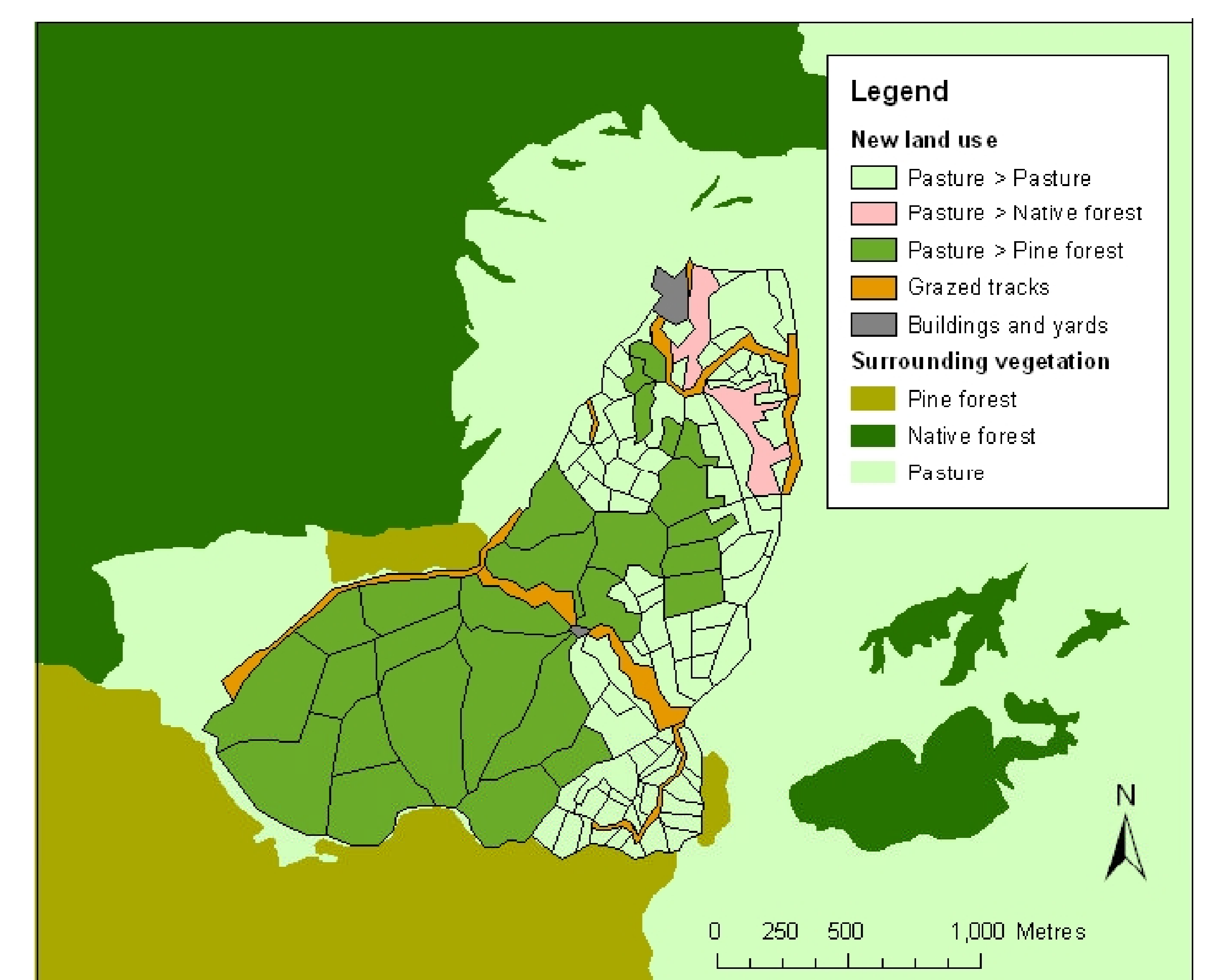
Phase 3 As a result of the land use and management changes, over 5 years there were improvements in a number of indicators: soil fertility, pasture production, animal performance, sediment loss, plant diversity, enterprise profitability (see indicator data table)

Indicator data table

Indicator	Old System	Benchmark value	New system
Soil fertility (Olsen phosphate)	17	25	23
Pasture production (t DM/ha/y)	9.5	12.1	10.0
Sediment export (t/ha/y)	2.86	0.44	0.69
Phosphorus export (kg/ha/y)	3.0	0.8	1.2
Indigenous plant diversity (# spp per plot)	20	34	28
Lambing (% weaned)	109	120	124
Cattle gross margin (\$/stock unit)	46	58	82
Annual farm surplus (\$/ha grazed)	181	253	285

Land use change implemented in phase 3

- Pinus radiata* afforestation of pasture on steeper land
- Changes in stock policy to high fecundity ewe flock and bull beef system
- Riparian protection by fencing and/or tree planting
- Indigenous forest fragment restoration
- Spaced-planting poplars for erosion control in pasture



Conclusions

- The participatory process achieved a facilitated consensus on appropriate goals, indicators and planning of land use change
- Land use change did improve economic and environmental indicators towards stakeholder goals
- Rates of change for some indicators were different from expectations
- Implementation costs were high relative to immediate returns

