



## Systems Thinking Workshop on the Emissions Trading Scheme

### Summary

An important consideration for the forestry sector is how carbon policy might impact on the New Zealand forest value chain. A stakeholder meeting was held to develop a qualitative model which is intended to be developed into a quantitative model. This will assist policy makers and forest owners with understanding the potential implications of an Emissions Trading Scheme (ETS).

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### Introduction

Eleven stakeholders from industry, government and research institutes participated in a systems thinking workshop. The workshop was facilitated by Prof. Bob Cavana of Victoria University. The focussing question was:

**“What are the effects of an Emissions Trading Scheme on the New Zealand Forestry Value Chain?”**

The aim was to develop a qualitative description of the potential impacts of an Emissions Trading Scheme, which could then be translated into a quantitative model for analysing the implications of alternative policies.

### Emissions Trading Scheme

The emissions trading scheme – or any scheme to reward carbon sequestration – is of importance to forest owners as it represents a new (and potentially high value) source of income (e.g. Maclaren *et al.*, 2008). To aid forest owners – and to guide policy makers – we are working towards building quantitative models in which we can simulate the potential outcomes of an ETS.

### Stakeholder Workshop

To develop a solid base for model development, it was vital to collaborate with industry and other research institutes. Invitations were circulated to numerous individuals in the forest value chain and research institutes, as well as through the New Zealand Institute of Forestry's (NZIF)

weekly newsletter. Participants in the workshop were from MAF, Tasman Forest Management Ltd., Catalyst R&D, Scion, Doshisha University (Japan), and Victoria University.

The structure of the workshop followed a 'systems thinking' format (Maani and Cavana 2000), designed to develop a holistic description of the system rather than focussing in on a number of points in isolation. The benefits of this approach are that linkages and dependencies can be identified, providing a qualitative framework for subsequent quantitative modelling.

### Findings

In the first step of the workshop, 83 'issues' surrounding the focussing question were identified. These were then clustered into groups of similarity which then formed the variables in a causal loop diagram (Figure 1). This qualitative model will form the structure of our quantitative systems models (Maani & Cavana, 2000). In a causal loop diagram, arrows of influence link important system variables, with a plus or minus sign designating whether it is a positive or negative feedback, respectively.

While physical impacts of the ETS were important, the workshop participants and the casual loop diagram show that a vital leverage point is the 'economic viability of forests'. This determines the language of the tool that is developed, and ensures it will contain a strong economic component.

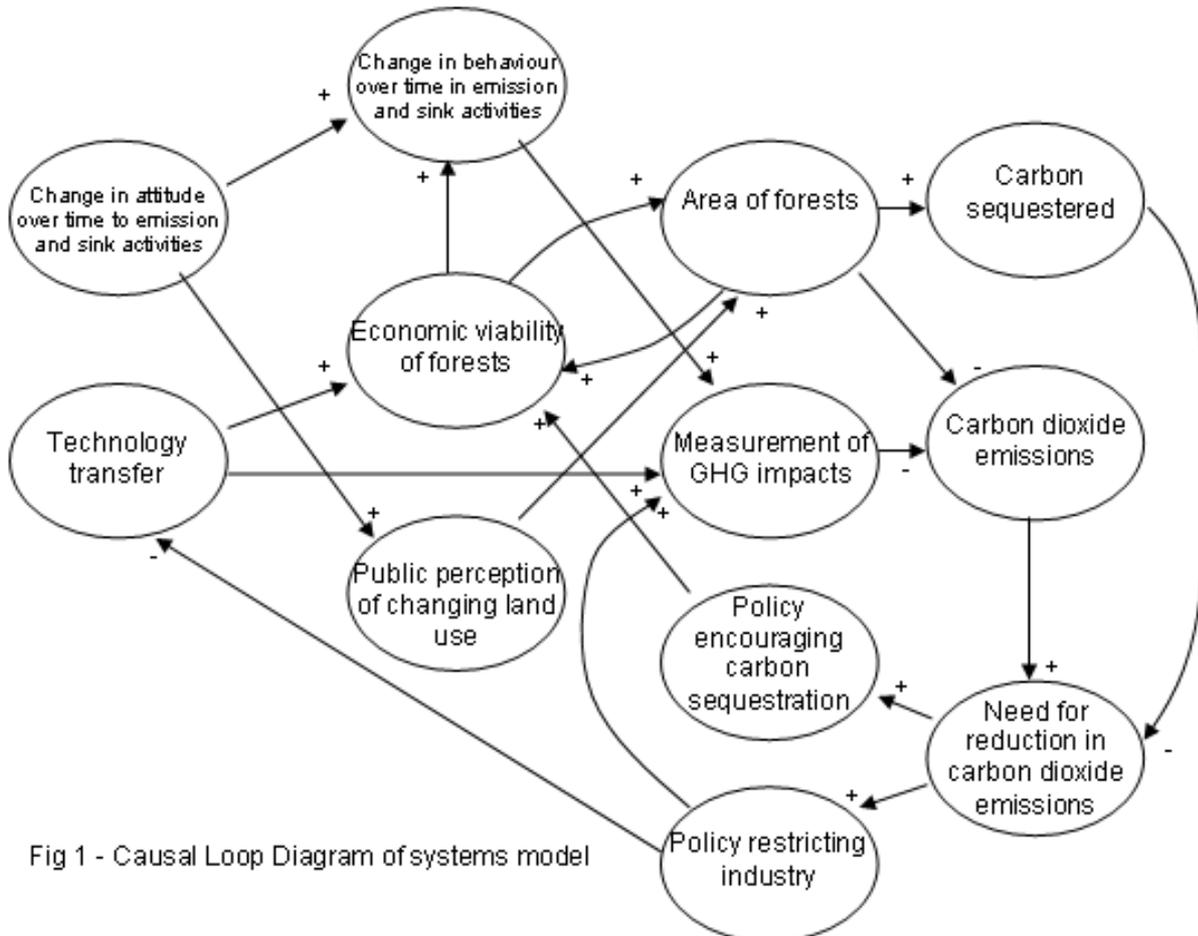


Fig 1 - Causal Loop Diagram of systems model

## Outcome

The model is well under way, with results from an early version being presented in June at the NZIF Annual Conference in Nelson, and a paper in the New Zealand Journal of Forestry to follow. The model used economic inferences from the workshop participants to simulate land use and forest management decisions, and the impact that a carbon price may have on these. Most input decisions are made from an economic viewpoint, whilst the output variables track physical quantities as well as economic indicators. It is expected that Scion will co-present further findings from these models with Bob Cavana at the 53<sup>rd</sup> Meeting of the International Society for the Systems Sciences in Brisbane.

## References

Maclaren, P., and Manley, B. (2008). Impact of the ETS on forest management <http://www.maf.govt.nz/climatechange/slm/grants/research/2007-08/pdf/2008-10-obj1-carbon-trading.pdf>

Maani, K.E. and Cavana, R.Y. (2000). Systems Thinking and Modelling: Understanding Change and Complexity. Auckland, Pearson Education New Zealand Limited, 2000