



Envisaging low emissions future farm systems in Aotearoa

EXPANDING TŌTARA PRODUCTION IN NZ

There is the potential for tōtara plantations to be incorporated throughout New Zealand's landscape, especially on hill country pastoral land. This would assist in meeting the country's greenhouse gas reduction targets. Significant inclusion of non-timber values including development of amenity areas, biodiversity, aesthetic attributes, and cultural significance are all added benefits from plantation tōtara. However, this change in land use will require a long-term mind set and financial assistance is likely to be vital.

This summary document covers the key, high-level findings of "Playing the long game. An analysis into the opportunity for the commercial expansion of tōtara plantation forest in New Zealand", one of a series of reports prepared for the New Zealand Agricultural Greenhouse Gas Research Centre (NZAGRC).

These reports examine potentially viable diverse land uses in New Zealand that could provide alternatives to the largely monoculture and ruminant-dominated pastoral agriculture systems across our landscapes at a more expansive farm systems perspective.

Building a sustainable industry

The analysis in the "Playing the long game" report proposes that the best option going forward when considering the viability of plantation-tōtara is to consider establishment and harvest techniques that differ from traditional New Zealand forestry. It will be necessary to avoid issues associated with traditional forestry such as lack of ecosystem benefits, clear felling, bare soil, and perpetual forest cover. Harvesting forest sustainably will provide benefits for the environment and align closer with socially acceptable principles.

Planned phased planting regimes seem most appropriate for any commercial expansion. As part of an eighty-year rotation, 1/80th of the planned area needs to be planted annually. For a 500,000 ha industry this means planting 6,250 ha per year, at a rate of 2,500 stems per ha (50% tōtara and 50% nurse species). This will ensure continuous forest cover during harvest. Monitoring of tōtara growth from farm-tōtara trees up to 160 years of age should be implemented to better understand potential harvest volumes.

To maintain continuous cover forestry, two trees per hectare are then harvested annually, giving an expected average annual harvest of 993,000 m³ (this is an average volume at full harvest production). These trees will need to be expertly selected to allow forest quality to remain stable.

Selective harvest through coupe felling techniques will allow the forest to remain in a near-natural state. This maintains many of the values mentioned throughout such as habitat, biodiversity, and aesthetic considerations.

Increased associated costs with these techniques will result in the requirement for a premium price to be received for the product. The product will need to be recognised as sustainably grown and harvested, something for which consumers need to be willing to pay a premium.

Tōtara as a plantation timber crop

There has been little work historically or currently being undertaken into the expansion of the tōtara industry beyond the Tōtara Industry Pilot Programme, focussed largely on sustainable logging of regenerating pockets of tōtara in Northland. This work has identified that there may be a place for plantation production of tōtara but has remained focussed on farm-tōtara (timber extracted from the regenerating on-farm tōtara).

Tōtara appears to have the greatest potential of New Zealand's native species as a plantation timber crop:

- It is widespread distribution across New Zealand
- A small but existing supply chain
- An expected commercial rotation length akin to the long-rotation exotic species growing in New Zealand.

Tōtara is likely to be used as a specialty product for uses such as interior (decorative) panelling. New Zealand currently imports around 65,000 to 80,000 m³ of hard wood, for use in the interiors of its homes and commercial buildings. There is potential for plantation-tōtara to substitute these imports, assuming the building of awareness for its use as a decorative timber. However, the expected annual harvest volumes are much higher. This means there will be surplus tōtara after the market has absorbed this substitution, potentially requiring export. However, this market does not currently exist and further exploration into this market opportunity is required.

The choice to plant a slower growing native species over a faster growing exotic species will depend on a landowner's desired period for and targeted level of return on investment, costs of establishing the forest and returns from the timber. The value of non-timber aspects such as carbon and biodiversity credits may incentivise more landowners to plant native species. Furthermore, how the landowner may value other attributes such as biodiversity, provision of habitat, aesthetic values, erosion control and water quality will have a heavy influence.

Effects on GHG emissions

"Playing the long game" evaluates the implications for reducing greenhouse gas emissions compared to both the upper and lower NZ methane reduction targets.

Due to the novelty of a commercial plantation-tōtara industry and the issues of extended timeframes, the requirement for further research was also highlighted. It was identified that 500,000 ha of plantation-tōtara would likely remove between 2.2% and 4.2% of the methane reductions required in 2050.

Financial assistance required for viability

With the management regimes recommended, return on investment is not likely to be achieved for a many decades period. This may mean consideration of government funding alternatively a co-operative approach may be required for the initial start-up phase of the industry to be viable.

To achieve acceleration in uptake of this industry within landowners, it is likely some form of monetary incentive/assistance will be required. Significant establishment costs and a delayed return on investment, in the absence of supplementary income streams, creates a substantial financial gap. To achieve methane reduction targets and promote plantation-tōtara as a viable land use, financial assistance is likely to be vital.

Summary

A viable business opportunity for land use change to plantation-tōtara based on sustainable management throughout the entire supply chain exists. However, this is subject to a significant initial investment by landowners and latter investment in the supply chain, which will likely require significant support from Government funds. The potential opportunities and highlights are summarised below:

- Sustainable forest management allows the industry to demonstrate responsibility and create a genuinely permanent harvesting option, providing multi-generational benefits.
- Multi-generational benefits would include aesthetic, recreational, cultural, and social values.
- Potential supplementary income streams may exist during the forest establishment (honey by-products, carbon credits) or become available such as biodiversity credits and utilisation of nursery crops.
- There are limited existing suitable land use change options suited for hill country land. Plantation-tōtara could provide a viable option for this land type.
- Job opportunities in rural supply towns, including training centres, students from which can be used in the industry.
- Partnership with Iwi can allow for re-connection between forests and the land, providing options for guardianship within the industry.

The accompanying risks are summarised in the full report.

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