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## Policy changes to support indigenous forests

**The deck is stacked against expanding indigenous forests. We can change that.**

### Summary

All land uses create wider impacts, positive and negative. Carbon pricing provides revenue to pine plantations for something they do well: sequestering large amounts of carbon quickly. Indigenous forests don't get the same support for the things they do well, such as stable, long-term carbon sequestration, enhanced water quality, or support for native biodiversity. As a result, New Zealand is probably planting too many pines and not enough native trees relative to the benefits they provide. There are several steps we can take to address the imbalance.

### What's the issue?

The 2024 report 'Why Pines?' reviewed several recent assessments of the feasibility of achieving water quality targets (Kaye-Blake et al., 2024). All the assessments relied on an increase in pine plantations to meet those targets. The 2024 report discussed many reasons for these findings, grouping them as market drivers, modelling issues and policy settings. Among the points raised was that exotic forestry – mainly pine plantations – economically outperforms indigenous forestry. Considering the market drivers, exotic forestry is commercially sensible.

However, there is more to consider than short-term market outcomes. We should also consider impacts on biodiversity and the wider human community. It is also important to understand how government policy affects land-use decisions.

### What's the economics?

The situation with exotic and indigenous forests can be analysed using what economics calls 'market failure' and 'government failure'.

Markets can be an excellent way to produce and distribute products and income. However, economic activity produces 'externalities' – impacts that are not included in those markets – leading to a market failure. For example, landowners can manage their properties to support biodiversity, but they haven't yet found a way to monetise this benefit, so they probably produce less biodiversity than the general public would like.

By analogy, there is also government failure. Governments put in place policies to deal with issues. Policies change people's behaviour, which can have both the intended effects and unintended or secondary consequences. For example, climate change policy promotes the planting of pine plantations, but under current industry practices and government oversight, this will increase the possibility that forestry residue will cause infrastructure damage in a storm.

### What's the solution?

There are steps the government can take to address the market failures and negative impacts of policies:

- **Put the Nationally Determined Contribution (NDC) to greenhouse gas reduction in the Crown's accounts.** That change can signal commitment to the NDC, thereby reduce uncertainty about future carbon markets and support long-term solutions such as native forests.

- **Create risk adjustments in the Emissions Trading Scheme (ETS) for carbon sequestration from forests.** Forests – and the carbon they store – are at risk of loss from fire, storm damage and pests. Some experts believe that those risks are higher for pine plantations than indigenous forests. Bringing risks into the picture can create a level playing field for all types of forests and all climate mitigation.
- **Create payments for biodiversity.** Pine forests are better than indigenous forests at quickly capturing carbon, so they are advantaged in the ETS. Indigenous forests are better than pine forests at supporting native biodiversity, but they aren't paid for those services. Essentially, government policy has created an imbalance that it could counteract.
- **Account for community impacts.** Forests can reduce local employment; forestry residue can lead to damage to roads, bridges and buildings; and exotic forests can create wilding pines. Government should assess the full range of externalities and take them into account with the ETS, consents and other policies.
- **Continue the work on freshwater.** Forestry is a good land use for water quality because of low losses of water contaminants. Upholding water quality targets would create more interest in all types of forestry and reduce uncertainty, leading to more investment in long-term projects. This work should also account for the water quality impacts of forest harvesting.

### Context on the primary sector

New Zealand's farming success since the 1980s has been based on subsidy-free farming that has allowed farmers to grow what produced the best return. We now understand that some of these activities – such as livestock farming that covers a large percentage of New Zealand's land – create

externalities that are not fully priced into the market.

The two most important externalities are greenhouse gas emissions and impacts on water quality. Other externalities include impacts on biodiversity and social and cultural contributions.

The right land use in New Zealand would achieve a balance across competing goals: the market drivers of income and profit and the non-market benefits related to environmental and social impacts. These market and non-market drivers need to be recognised across all land uses: commercial forestry, indigenous forestry, sheep and beef farming, and other land uses.

All these activities have costs and benefits to be considered. How we approach the size of these costs and benefits will depend on the value that New Zealanders place on both market and non-market impacts. One issue is that we do not have a comprehensive understanding of these values. We have a fragmented understanding and, therefore, partial fixes to address certain parts of the system.

One of these partial fixes is the ETS. It is focused on one non-market impact – greenhouse gases and meeting New Zealand's climate commitments by 2050.

The challenge is connecting the decisions of individual landowners and the benefits to the wider community in a holistic way.

One place we see this challenge is with forests. Indigenous forests provide benefits that are valued by the wider community but are difficult for individual landowners to turn into revenue for themselves. Finding ways to reward these individuals when they do something with a wider benefit – such as planting indigenous forests – is a policy challenge.

### Different types of forests

This commentary contrasts exotic forests with indigenous forests. Exotic plantation forests in New Zealand are mostly pine trees, so 'exotic' and 'pine' are used mostly interchangeably. Forests can be either for harvest or permanent forests, with the latter being grown for revenue from carbon credits, biodiversity conservation, landscape resilience and cultural purposes. Indigenous forests can be either planted or allowed to regenerate through natural processes and some management. Some existing indigenous forests are degraded and would benefit from restoration and management. Most of these details are not discussed in this Insight, but they would have little effect on the key messages.

Indigenous and exotic forests have key differences. First, they sequester carbon at different rates. Pine trees grow quickly, so they store carbon quickly. Although indigenous forests grow more slowly (Bellingham et al., 2023), experts suggest that they are more resilient in the long term and can store as much or more carbon as exotic forests. Indigenous and exotic forests also differ in the kind of biodiversity they support. Indigenous forests provide better support for native plant and animal species (Norton, 1998).

Revenue from forests potentially comes from several sources. The logs provide income from harvested forests, whether that is done with clear felling or selective harvesting. Eligible forests can earn revenue from carbon credits through the ETS. Reflecting the growth curve of different forests, pine forests earn more revenue sooner than indigenous forests. Forests can also be used to earn other types of revenue, for example, from farm tourism or nature tourism activities.

Forestry brings with it additional costs. These include planting, fencing, pruning, weed control, animal pest management and roading. Costs vary widely depending on the

site, existing infrastructure, species planted, and management regime.

Forestry is subject to risk and uncertainty, just like other economic activities. The physical forest is at risk from fire, storm damage and pest damage, and these are all the more significant because production requires decades. Profitability is also at risk from cost and price fluctuations. When trees are planted, the price of logs at harvest is unknown but crucial for the financial performance of the investment. Likewise, the price of carbon is an important risk. To a large extent, these risks are borne by the owner, so they are simply part of normal economic considerations and not externalities.

The balance between costs and revenues determines economic viability. Pine plantations are profitable: revenue from carbon and wood is more than enough to pay all costs under current forestry practices.

The economics of indigenous forests are more difficult. One analysis suggested that the revenue from carbon over a 50-year period would pay around one-half of the cost of indigenous forest regeneration (Carver & Kerr, 2017). Analysis based on 2023 modelling conducted for the organisation Pure Advantage to support its initiative Recloaking Papatūānuku was more positive. It indicated that the current price of New Zealand carbon credits is high enough to support the cost of sequestering carbon by planting indigenous forests. However, the cost of sequestering carbon by planting exotics was even lower. These results suggest that, with current policy and market settings, planting natives is worthwhile, but planting pines is more profitable.

### Benefiting from trees

Recloaking Papatūānuku supports increasing the amount of indigenous forestry by retiring marginal land from pastoral production to allow regeneration and by weaving more indigenous reforestation into existing land uses.

Trees stabilise slopes, which reduces the damage to land and landscapes from storms. They reduce erosion, reducing the amount of sediment going into waterways. They capture and store carbon. Increased indigenous forestry brings benefits to water quality, native biodiversity, landscape resilience and – with the right arrangement – payments for carbon sequestration.

Ultimately, the landscape should reflect the costs and benefits of each land use: the right activity in each location, taking into account all the market and non-market impacts (e.g. Dominati et al., 2021).

### Market failure: climate change

When thinking about the value of forests, externalities are important.

Climate change has been called the greatest market failure the world has seen (Benjamin, 2007). The capacity of the global environment to absorb greenhouse gas emissions is a common pool resource that the world shares, but no one controls the use of that resource. A little country like New Zealand cannot by itself affect the global system. In the language of economists, there are clear incentives for free-riding, or letting everyone else do all the work of managing emissions. Because the climate benefit of planting trees is mostly externalities – the rest of the world gets the bulk of the benefit – the economic incentive is to do less rather than more.

International negotiations on greenhouse gases are meant to counteract the market failure. By signing up to its Paris commitment for NDCs, New Zealand has pledged to do its part on climate change while other countries do theirs. However, it isn't clear what the reputational consequences will be for missing the Paris target; there are suggestions it *could impact negatively on New Zealand's international reputation and trade relations* (Leining et al., 2024). If the consequences are small, then we are back in a world with an incentive to free-ride. If the consequences are large – if New Zealand exports from

agriculture, tourism, and education suffer from damage to the country's reputation – then the country would internalise the externality of greenhouse gas emissions.

The purpose of NDCs, the ETS and other carbon policies is to move greenhouse gas emissions from being an externality to part of economic decision making – to internalise climate impacts into markets. Recognising the full value of forests is part of rectifying the market failure of climate change.

### Market failure: water quality

Water quality also has the problem of a market failure. No one owns or controls freshwater quality in our waterways, and the effects of contaminating or mitigating activities are transported from the source downstream to other water users.

Forestry produces positive externalities for water quality. The four main water contaminants are nitrogen, phosphorus, E. coli and sediment; forestry produces less of all of them than other land uses. There isn't the same level of fertiliser as pasture, so nutrient losses are lower. There aren't the same E. coli losses from cattle and sheep, although there can be other, smaller sources of E. coli. Sediment can be a problem during harvest, but on average, over time, the losses are lower (Baillie & Neary, 2015). However, those water quality benefits are additional to the economic value of logs and carbon, and foresters are not paid to produce them.

Improved biodiversity is another positive externality. Biodiversity in indigenous and exotic forests, especially in comparison to the pasture the forests might replace, is a complex topic (e.g. Dominati et al., 2021; Norton, 1998). The details are outside the scope of this Insight; the relevant point is that farmers and foresters are not paid for any biodiversity they create or support with their actions. To the extent that one land use is better than another for biodiversity, the lack of payments falls unevenly on the different land uses.

There are also negative externalities to consider. Forestry residue or 'slash' from harvesting has been a factor in damage to downstream communities in storms like Cyclone Gabrielle. Pine plantations also result in wilding pines and transform pre-existing ecosystems (Bellingham et al., 2023). These invasive pines damage the amenity value of landscapes in New Zealand and lead to monetary costs from efforts to remove them (New Zealand Government, 2022b).

Growth in forestry also changes economic activity spatially and over time. Even where there is growth in the total number of jobs, employees tend to live in larger centres and travel out to work sites for planting, pruning and harvesting. Small communities can lose jobs and residents. Permanent forests can be even worse: after planting and perhaps some additional management in the first few years, they may support little employment. The negative externalities of disruption, community decline and possibly lower employment are not borne by the forest owner but by others.

Finally, the risks discussed above can also lead to negative externalities. Through the ETS, the country is paying during the first rotation for carbon storage, which is meant to be permanent. In theory, a loss of a forest through fire or storm could lead to a carbon liability: the owner would have to pay back the money. However, if the people or company don't have the resources, they can go bankrupt. In that case, the government would pick up the liability because, ultimately, the NDC is a country-level commitment. There exists the potential to privatise the revenues and socialise the losses.

### Government intervention

Government programmes and their impacts influence the value of indigenous forests. In particular, government policies take time to develop and embed. The different maturity of carbon policies versus other policies skews support for various land uses.

The ETS pays foresters for the value of carbon stored and pays at a higher rate for pine trees than indigenous forests. The shift into pine plantations seen in the work discussed in the 'Why Pines?' report was not due solely to carbon payments. The underlying value of logs was also important. However, carbon payments did increase the number of pine plantations and promoted pine over native trees because of the timing of payments. As a result, most of the land in the ETS is in exotic forests (Carver & Kerr, 2017).

Just as important as the policies that are in place are those that are not. Because there is now a mechanism to pay for storing carbon, that function (previously an externality) is given more weight in land-use decisions and other functions are given less weight.

- Freshwater policy is not fully developed, and the Government is looking to change requirements. The policy uncertainty creates a lack of clear signals, so landowners don't know which land uses have higher priority and which contaminants need to be reduced. Any freshwater benefits from forestry, indigenous or otherwise, are therefore deprioritised in land-use decisions.
- Biodiversity policy is even further behind. There is research on the biodiversity benefits of forestry, and there is domestic and international interest in supporting biodiversity. However, there is no currently defined unit of biodiversity – such as there is for carbon emissions – and no requirement to account for biodiversity impacts.
- Community support policies are uneven. Rural communities have faced the closure of hospitals, schools and government offices and the negative consequences of those decisions. The aftermath of COVID-19 and the increase in remote working has made it clear that government policy can influence whether central city businesses have customers (NZ Herald, 2024). The Government is currently

looking to bring workers back to city centres while not affording rural communities the same sort of supportive policies. The decline of rural communities is treated as a natural, inevitable process, ignoring the role of government policy in contributing to the decline.

### Five actions to support indigenous forestry

#### Action 1. Put the carbon liability on the Crown books

Uncertainty gets in the way of making long-term investments. Officially recognising the government's commitment to emissions reduction by putting carbon liability on the books (Carver & Kerr, 2017) would support the kind of long-term thinking that benefits investment in indigenous forests.

Currently, the Treasury does not view New Zealand's commitment as a legal or constructive obligation, so it isn't included as a liability in the Crown's books (The Treasury, 2024). However, discussion and advice this year by the International Accounting Standards Board puts pressure on that stance (Morrison & Hood, 2024). The commitments may need to be treated as future liabilities. In that case, actions to reduce carbon emissions would have the benefit of reducing those liabilities. Right now, emissions-reduction actions are all fiscal costs and not recognised as a benefit. The Treasury has estimated that New Zealand would need to purchase \$3.3 billion to \$23.7 billion of offshore credits to meet its NDC1 obligation (The Treasury & Ministry for the Environment, 2023, p. 80). Growing that carbon domestically would help fund a new, large primary industry.

Forests of any sort are just another primary industry, and carbon sequestration is just another product. New Zealand is good at producing primary products. The resources of the country – our land, people and money – should be used to produce products in which it has a comparative advantage. That includes domestically produced carbon credits.

#### Action 2. Create quality adjustments in the Emissions Trading Scheme (ETS) for carbon sequestration from different forests

Carbon credits are payments for removing carbon emissions from the atmosphere permanently or at least for 100 years. However, the quality of the storage might not be the same. As noted by then-Forestry Minister Stuart Nash, *Permanent exotic forests like radiata pine have potential environmental and ecological risks. These include pests, fire, damaged habitats for native species, biodiversity threats, and a relatively short lifespan compared to well-managed mixed indigenous forests* (New Zealand Government, 2022a).

These additional risks attached to exotic forests make it less certain that carbon will be stored 'permanently'. Creating quality adjustments in the regulations could allow indigenous forests to be recognised for the expectation that carbon is stored more securely in them.

#### Action 3. Create payments for biodiversity

Pine forests are better than indigenous forests at quickly capturing carbon, so they have an advantage in the ETS. Indigenous forests are better than pine forests at supporting native biodiversity, but they aren't paid for those services.

Economically, this can be considered a government failure because government action to solve one problem has created unintended negative consequences – less planting of indigenous forests than is optimal. It's a consequence of the fact that the government cannot do everything at once. Creating and implementing policy takes time, and focus has to be managed and prioritised.

However, the issue of biodiversity has risen in importance, especially for the primary industries. It's clear that managed environments like farms and plantation forests have consequences for biodiversity and that well-managed indigenous forests can support native biodiversity. It will take time to

turn that scientific knowledge into government programmes that can fairly reward different land uses for their contributions to biodiversity. Taking the first steps towards payments for biodiversity would help redress the imbalance in current government policy that has tended to favour exotic forests.

#### **Action 4. Account for community impacts**

Forests have impacts on the wider community, and the type and size of impacts are different for exotic and indigenous forests. Some of the impacts already discussed are on employment, infrastructure and landscape amenity values. Forests can also create positive community benefits. For example, they are used for recreation by cyclists, joggers, walkers and dog owners, and they can have cultural significance.

By paying for carbon sequestration, the government has monetised just one of the externalities of forests. Understanding the value of other externalities would be important in getting the balance right across different land uses.

#### **Action 5. Continue the work on freshwater policy and stabilise regulations**

As prior research has shown, forestry is a good land use for achieving water quality targets. At the moment, freshwater policy is under review, and significant changes have been made. These sorts of changes create uncertainty about the long-term value of mitigation actions, which reduces the value of indigenous forestry relative to other land uses. Upholding water quality targets and demonstrating support for farm planning to address water quality issues would reduce uncertainty. In turn, it would create more interest in all types of forestry and support more investment in long-term projects.

#### **Conclusion**

Forests and forestry – exotic and indigenous – create positive and negative externalities. Because those externalities aren't paid for in a market, there is a market failure to provide

the optimal amount of forest. The government has worked to deal with the market failure of climate change by rewarding forestry for one of its positive externalities: carbon storage. That effort has produced a government failure: it shifted the balance of pine and indigenous forests towards the one that sequesters carbon quickly, not necessarily the one with the best overall benefit. By honestly assessing the total economic value of all land uses, including externalities, the New Zealand government can determine what an optimal amount of indigenous forest would be. The information available suggests that would support an expansion of indigenous forests and all the benefits they can provide.

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