Chapter 18

Aronga Kaupapa – Ngā Ngahere me Ngā Repo Mauwaro
Policy direction for forests and other carbon stocks

Summary

In Aotearoa, forests are the only option available now for removing carbon dioxide from the atmosphere at scale.

Our advice prioritises stopping emissions at source. This means strategically managing forests to provide a long-term carbon sink for Aotearoa, rather than using them as a primary tool to meet our 2050 emissions reduction targets (2050 targets).

To achieve this, we recommend:

- A comprehensive national programme to establish more native forests. Native forests will remove emissions beyond 2050 and provide multiple co-benefits, including cultural, biodiversity, erosion control and water quality benefits.
- Amendments to the New Zealand Emissions Trading Scheme (NZ ETS) and other climate policies to manage the amount of forests planted due to climate policies. While our advice recommends planting more exotic production forests, we recommend fewer than the country would see under current NZ ETS settings.
- Effective, integrated pest management to help establish new forests and maintain carbon in existing forests. Pests such as deer and goats can quickly destroy new forests and reduce the carbon stored in existing forests.
- Government clarify the role of permanent exotic forests in our transition and develop and amend policies to deliver against this. Some stakeholders are concerned about permanent exotic forests being established at scale in a way that does not contribute to local economic activity and employment, and that may cause environmental risks.
- Encouraging additional carbon storage in smaller blocks of trees on farms.
- Preventing loss of carbon from drained peatlands and the destruction of wetlands.
- Maintaining and increasing the carbon stock in existing pre-1990 forests through activities like pest and fire control, and enrichment planting.

Changes in our final advice

Our final advice is more explicit about changing the NZ ETS to manage afforestation. This is critical to make sure that gross emissions in Aotearoa reduce.

We heard that Māori-collectives face a range of constraints that limit their scope to manage their whenua in alignment with their rangatiratanga and collective aspirations. We now have a recommendation for the Government to consider ways to give more flexibility for Māori-collectives with pre-1990 forest on their whenua.

We received submissions about the negative impacts of large-scale permanent exotic forests, particularly those planted solely for carbon, on rural communities and the wood processing industry and about the higher potential of alternative exotic species for carbon sequestration.

We heard through consultation that forests cannot be established with the current prevalence of pests, so we recommend effective, integrated pest management.

Introduction

1 Forests play a significant role in the history, culture, economy, and biodiversity of Aotearoa. Forests will play an important part in helping Aotearoa to meet emissions budgets and the 2050 emissions reduction targets, because they are the only way to remove carbon dioxide from the atmosphere ('emissions removal') that is currently available at scale.

2 Different types of forest will play different roles. New exotic production forests will be important to help meet emissions budgets and targets and to help sustain a thriving, low-emissions bioeconomy. At the same time, establishing new native forests will be key to maintaining net zero long-lived greenhouse gases in the long term, balancing emissions from hard-to-abate sectors, while providing multiple co-benefits.

3 The role that emissions removals from forests play must be balanced with the need to make gross emissions reductions, and consider potential impacts of land conversion on rural communities and the broader food and fibre sector.

4 Establishing new forests provides a one-off opportunity to remove carbon from the atmosphere. However, land converted to forestry needs to be kept in forests for the indefinite future, to keep that carbon stored. Continuing to remove emissions through forests would require ongoing land conversion. We have heard through consultation concern about extensive land conversion to forestry.

5 Our policy direction recommends a package of policies to support the establishment of forests to provide a long-term carbon sink for Aotearoa. Our advice draws on the three pillars of our policy approach: actions to address barriers; pricing to influence investment and choices; and enabling innovation and system transformation.

6 Adjusting pricing instruments to deliver the appropriate mix of incentives for reducing gross emissions and emissions removals by forests is central to our advice.

7 We also recommend action to incentivise native afforestation, manage localised impacts of afforestation and to maintain and increase existing carbon stocks. Investment is also needed to help improve knowledge and reduce the costs of establishing new native forests.

8 Fast-growing species (usually exotics) can be used to balance emissions over the next few decades, while slower growing species can balance future emissions.

9 It takes time to establish forests and for them to start sequestering carbon. Work is urgently needed to develop the incentives for native forests so they can remove sufficient carbon as Aotearoa gets closer to the 2050 target.

18.1 Manage forests to provide a long-term carbon sink

10 Forests act as a **sink** – they remove carbon from the atmosphere while they are growing. This adds to their carbon **stock** – the amount of carbon stored within the forest.

11 Forests will play an important role in meeting the country's emissions budgets and targets. Our demonstration path assumes 300,000 hectares of new native forests and 380,000 hectares of new exotic forests are established between 2021 and 2035.

12 This would provide sufficient biomass feedstock for the bioeconomy, and several analyses show that there is enough suitable land available to support this level of forestry.

13 Reliance on exotic forests as a carbon sink beyond this could divert action away from reducing gross emissions in other sectors and could make maintaining net-zero greenhouse gas emissions after 2050 challenging. However, new native forests could provide an enduring carbon sink that would help to offset residual long-lived emissions from hard-to-abate sectors over the long term.

14 There are many other worthwhile reasons to establish forests beyond climate change. Decisions about incentives for forestry should be considered alongside other strategic outcomes for the country's land including water, biodiversity, cultural, social, and economic outcomes.

15 There may be implications for Iwi/Māori who already experience constraints managing collectively-owned land, such as ownership, access, and cultural impacts. It will be important to ensure Iwi/Māori rights and interests are understood and recognised.

16 To support an equitable transition, the Crown needs to work in partnership with Iwi/Māori-collectives to understand their existing barriers and aspirations for land use in relation to forestry.

17 Policy approaches need to consider the unique characteristics and historical circumstances of Māori collectively-owned land, and must give effect to the Treaty principles of partnership, protection, participation, and equity while also recognising the guarantee of rangatiratanga and kaitiakitanga under Te Tiriti o Waitangi/The Treaty of Waitangi. See *Chapter 19: Policy direction for an equitable transition for Iwi/Māori* for more detail on implications for Iwi/Māori.

18 There are risks to relying on carbon stored in forests. Future changes in climate may affect tree growth rates, increase wind throw and wildfire, and enable more pathogens to spread. It will be important to explore approaches to mitigate these risks across different types of forests, including the use of silvicultural techniques such as mixed species, diverse age classes, and continuous cover forestry.

19 Browsing pests, such as possums, goats, and deer, as well as invasive weeds, pose a significant threat to the establishment of new forests. They can also pose a risk to the health of existing forests, and the carbon sink they provide. Pests will need to be effectively managed, including through efforts such as Predator Free 2050, to make sure forests can play the role that we recommend in our advice.

Box 18.1: There are different types of forest with different characteristics

Native forests:

Native forests are comprised of indigenous species. They are typically multi-age, multi-species forests that grow slowly and continue to remove carbon dioxide for centuries. Harvesting is generally prohibited in existing native forests that are publicly owned.

High-value native trees, however, can be **selectively harvested** on private land. Native forests can be established through methods such as **reversion** (setting up the conditions for land to revert through activities like pest control and fencing) and **planting** seedlings. **Enrichment** planting of additional plants within these existing forests can increase their carbon stock.

Exotic forests:

Exotic forests consist of tree species that are not native to Aotearoa. Most exotic forests in Aotearoa are conifers, mainly radiata pine, with some Douglas fir and redwoods. There are also other species, such as eucalyptus, oaks, and acacia.

Most exotic forests are planted as single species, though some self-seed. Conifers that have self-seeded in undesirable locations are termed wilding pines, wilding conifers, or tree weeds.

Production forests:

Production forests are planted to be harvested. Production forests in Aotearoa currently are largely exotic trees planted as a **single species** which are then usually **clear felled** (completely removed) after the trees have reached the desired age.

Permanent forests:

Permanent forests are established with no intention of clear-fell harvest. These could be established through either reversion or planting and might be native or exotic species.

While many of these forests are established with no intention to harvest, some permanent forests are established with the intention of selective harvest or to act as **nurse crops** transitioning to mature native forests.

A forest can be registered in the New Zealand Emissions Trading Scheme (NZ ETS) as permanent if it meets certain conditions, such as maintaining canopy cover.

Some forests are planted as **mixed species** (sometimes a mix of exotic and native), and these forests are more likely to be selectively harvested rather than clear felled, due to the different ages of trees. Forests selectively harvested in this way can still be considered permanent.

Pre- and post-1990 forests:

For accounting and policy purposes, a distinction is made between forests established prior to 1990 (**pre-1990** forests) and forests established after 1989 (**post-1989** forests).

For further information about this, please see *Chapter 10: Rules for measuring progress towards emissions budgets and 2050 targets.*

18.2 New native forests can provide an enduring carbon sink

20 Native forests remove carbon at slower rates than exotic planted forests, but can continue to sequester carbon for hundreds of years. Native afforestation needs to start now to provide enough removals to maintain net zero long-lived greenhouse gas emissions beyond 2050.

21 A large number of submissions were very supportive of establishing new native forests, with some noting that native forests also offer other benefits, such as improving biodiversity, providing habitat for birds and other native species, as well as recreational and spiritual benefits.

22 However, there are currently limited incentives for landowners to change less-productive farmland to native forests – this was also highlighted in some submissions including many from farmers and other landowners.

23 Depending on location, new native forests can be established either by assisting land to revert naturally back to native forests, or through planting. Both approaches come with a cost for landowners, including fences, planting, weed and pest control, and some land would be lost from grazing.

24 There is an estimated 1.2 to 1.4 million hectares of erosion prone land in Aotearoa, some of which is government owned. Much of this is not suitable for production forestry but could be suitable for native forest.

25 For land to revert to native forest, most locations would require active pest control. Reversion is a lower cost method for establishing forests compared to planting, although there is evidence that growth and carbon removal rates are lower.

26 Manaaki Whenua estimated in the Aotearoa Circle *Native Forests Report* that there is around 740,000 hectares of less versatile private land, which is not suitable for commercial forests but could naturally revert if pests are managed. Some of this will be pockets of land within existing farming system that might be steeper and/or erosion prone.

27 In some places, if managed appropriately, there is also potential for new native forests to be selectively harvested to provide high-value timber and non-wood forests products, while still being considered 'permanent'.

28 Some submissions, including from the forestry sector, individuals, and farmers, noted that establishing the amount of native forest recommended in our policy direction presents a considerable challenge. Ensuring the survival of planted seedlings, including protecting them from pests like deer and goats, will be difficult. The costs could also be significant.

29 The rates of native afforestation included in our advice are a significant step up from what has been seen in the past. Costs for landowners will need to be reduced for Aotearoa to deliver this.

30 Potential ways of doing this include through government mechanisms like direct grants, which could be linked to carbon removals, or to the broader ecosystem services these forests provide. Incentives will need to be carefully designed, and guided by experiences gained through initiatives like the One Billion Trees programme.

31 Establishment costs could also be reduced over time through activities like research and development into seedling production and establishment methods (including mātauranga Māori), and sharing this knowledge among practitioners. Information on the rates at which different types of native forest remove carbon is also limited, which makes it hard to reflect the carbon benefits of native forests in policy.

32 Existing native forests store a large amount of carbon, including a large amount on the conservation estate. However, in many regions the younger trees are at risk from browsing pests, which threaten the future forests' health and stored carbon.

33 The population of browsing pests, particularly goats and deer, has increased significantly over the last decade. Urgent and ongoing pest management is required to maintain the integrity of forests and the carbon stored in them. Enrichment planting within degraded forests can also be a cost-effective way to increase the carbon stored.

34 Expanding and restoring native forests aligns with restoring the mauri of the land. Consideration of how to balance the multiple aspirations of Iwi/Māori will be needed. For example, it is important that new forests align with Iwi/Māori rights to exercise kaitiakitanga and rangatiratanga, and their economic aspirations.

35 More broadly, delivering this level of native afforestation will require stable policy, to reduce uncertainty for supporting industries and infrastructure providers – including to increase native seedling nurseries, and to grow the labour force for planting and pest control. Adequate governance arrangements will be important, as will investment in scaling up capacity and expertise.

18.3 Production forests could play multiple roles in the transition to low emissions

36 Production forestry can be an important carbon sink in the short to medium term and can provide a feedstock for the bioeconomy (see Recommendation 15 in *Chapter 13: Policy direction that cuts across sectors*). Mature production forests also have other benefits including for erosion control, water quality, biodiversity and providing recreational value.

37 Exotic production forests sequester carbon quickly. However, they only contribute towards meeting emissions budgets and targets until they reach their long-term average carbon stock – which is around 23 years for the most common species, *Pinus radiata*.

38 Because of this, production forests planted over the next decade will contribute towards emissions budgets until only about 2050. Production forests planted after 2030 will contribute to removals in the longer term.

39 There is a considerable amount of pre-1990 forest on the whenua of Māori-collectives, such as whenua returned under Treaty settlements as well as Māori freehold land. This land is effectively locked into commercial forestry due to NZ ETS liabilities, coupled with capital constraints. The objective for Māori-collectives is to retain the whenua for future generations so it cannot be used as collateral for development, which contrains their ability to raise capital.

40 Māori-collectives with limited access to capital or other land resources would find it difficult to make use of offsetting provisions in the NZ ETS, which allow pre-1990 forest land to be deforested without a unit surrender liability if an equivalent forest is planted elsewhere.

41 The Government should consider allowing more flexibility to enable Māori-collectives to change land use to support other social, cultural, environmental or economic priorities for the intergenerational wellbeing of their members – such as food sovereignty and papakāinga development. This would also support more equitable treatment for Māori-collectives who have been prevented from making decisions over their whenua.

42 There is a risk that deforestation of post-1989 forests could lead to several million tonnes of carbon dioxide being emitted from forests over budget periods (see *Chapter 7: Demonstrating emissions budgets are achievable, Section 7.10*). Around half post-1989 forests (around 320,000 hectares) are not registered in the NZ ETS and so face no disincentive to deforestation.

43 There are also many post-1989 forests that were registered in the scheme well after the forest was planted, for which the costs of harvest and deforestation are the same, and for which remaining in the NZ ETS for future rotations gives no net benefit. This means they could change land use away from forestry (deforest) without any further NZ ETS cost.

Current NZ ETS settings will incentivise more production forestry than needed

44 A significant increase in exotic afforestation is needed to meet the first three emissions budgets. Some submissions noted that achieving this will require supporting infrastructure such as nurseries, planting, and silviculture services to be expanded.

45 However, current NZ ETS settings will incentivise more planting of fast-growing exotic species, such as pine, after 2030 than is desirable to meet the 2050 targets in a way that is consistent with our budget advice (see *Chapter 5: Recommended emissions budgets*).

46 The NZ ETS does not differentiate between carbon removals by forests and reductions in gross emissions. Therefore, in its current form the NZ ETS will drive the relatively low-cost option of planting pines rather than more costly gross emissions reductions. Submissions were largely supportive of the need to make changes to the NZ ETS to align more closely with our advice.

47 There are several ways the NZ ETS could be amended to manage incentives for afforestation so that the scheme delivers outcomes that align with our advice.

48 This includes, for example: reducing demand by limiting how many forestry units non-forestry participants can surrender, or requiring them to pay an additional fee when surrendering forestry units; reducing the rate at which units can be earned by exotic forests; or limiting the overall area of forest that can be registered in the NZ ETS each year, or otherwise amending the eligibility criteria. There may also be other options.

49 Each option will have different impacts on different groups, and the Government will need to identify and work through the risks and benefits of different approaches during the policy development process. This should include engaging and consulting with people affected by the proposed changes, to understand the implications and avoid unintended consequences.

50 Ideally, this process would proceed in a timely manner, to avoid prolonged uncertainty about how the NZ ETS will operate. This would risk the perverse outcome of discouraging investment in the forests that are needed.

51 The implementation of any approach to manage the NZ ETS incentives for afforestation should also take into account forests that are not covered by the NZ ETS, on both private and public land.

52 During consultation a number of submitters expressed concerns about the impacts of permanent pine forests planted only for carbon purposes. This includes concerns about impacts on rural communities and provincial centres that rely on the food and fibre sector for work (see *Chapter 8: Demonstrating emissions budgets can be fair, inclusive and equitable*). Some submitters thought that these forests provide no local economic benefits and that they may not be managed well over the long term, creating environmental risks.

53 There was also concern that as the NZ ETS price rises, shifting production pine forests to become permanent carbon forests would become more attractive than harvesting, with negative impacts on wood supply and employment. Some suggested that only native forests should be permitted to register into the NZ ETS as permanent forests.

54 There are some legitimate concerns about impacts and risks from large scale permanent pine forests. However, there are also other permanent exotic forest types that could provide benefits. For example, unharvested exotic forests that are actively and appropriately managed could transition to native forests over time.

55 Other exotic species, such as redwoods or oaks, could also be selectively harvested to provide economic benefits and carbon income while still being considered 'permanent'.

56 Permanent forests must be kept as forest to maintain their carbon stock. There are penalties if permanent forests registered in the NZ ETS are deforested. Many areas of land permanently in forest are also covered by covenants, such as with the QEII trust.

57 The Government should develop a clear position on the role of different types of permanent exotic forests. This should flow through to how they are treated in climate policy, for example whether land converted to fast growth exotic forests can register as permanent in the NZ ETS.

58 During consultation we also heard concerns that whole farms are being planted in exotic production forests, sometimes encouraged by Overseas Investment Act provisions that facilitate foreign investment in forest land. If this is done at significant scale, there could be negative impacts on rural communities that rely on the food and fibre industry for employment.

59 Constraining the NZ ETS incentive could help reduce the scale of afforestation nationally, but influencing where afforestation happens, including how much in specific regions, would likely require a regulatory approach, for example through planning rules.

60 There are multiple pieces of legislation that affect how land is used in Aotearoa. Resource Management Act (RMA) tools such as National Environmental Standards and provisions for Significant Natural Areas are designed to manage environmental impacts.

61 However, some submitters told us that these are not sufficient to manage the full impacts of afforestation. The current revision of the Resource Management system provides an opportunity to align environmental policies to achieve multiple outcomes.

18.4 Areas of forest interspersed with other land uses provide multiple benefits

62 Smaller areas of forest interspersed with other land uses can create a 'mosaic' type landscape that can provide multiple benefits, including supporting biodiversity, erosion control, water quality and animal welfare.

63 New areas of permanent trees and vegetation can be established in locations that are less suited for livestock (such as gullies). This would help to create diverse silvopastoral productive landscapes at farm, catchment, and regional levels (for more information see *Chapter 17: Policy direction for agriculture*).

64 The additional carbon removed by small areas of vegetation on farms and in urban green spaces is not currently recognised in target accounting, though it is in *New Zealand's Greenhouse Gas Inventory*. However, ongoing technology developments may make it more possible to robustly estimate emissions from these areas in future.

18.5 Soil carbon, wetlands and oceans can also provide significant climate benefits

65 Aotearoa soils are naturally rich in carbon and it is important we retain this to support climate benefits and soil health. Changing land use (for example, from pastoral to cropping) can reduce soil carbon. However, the evidence base for how different management practices (for example, irrigation) impact on soil carbon is still being built.

66 Some soils in Aotearoa are losing carbon stock rapidly. This is particularly the case for drained peatlands, some of which are shrinking and dropping below sea levels. While this is a small percentage of all soils in Aotearoa, they are concentrated in particular regions such as Waikato, Manawatu and Southland.

67 Rewetting peat soils can halt and reverse these losses, and would have co-benefits, particularly for climate adaptation, biodiversity, water quality, and managing extreme rainfall. However, carbon losses or gains from peatlands are not currently captured in target accounting (for more information see *Chapter 10: Rules for measuring progress towards emissions budgets and 2050 targets*).

68 Carbon in the ocean ('blue carbon') could also be a source and sink of emissions. Some submissions referred to a recent study concluding bottom-trawling releases carbon from the seafloor. Other submissions noted that marine protection could help maintain stores of carbon in marine environments such as sea grasses, salt marshes and marine sediment.

69 While human actions can directly impact the amount of carbon stored in the marine environment, more work needs to be done to understand and quantify this. Building the evidence base on this would improve the Government's ability to factor carbon impacts into its decisions about managing the marine environment.

Recommendation 25

Manage forests to provide a long-term carbon sink

We recommend that, in the first emissions reduction plan, the Government commit to:

Developing a framework of actions to deliver a mix of exotic and native forest sinks, and manage these and other carbon stocks, to provide flexibility to meet emissions budgets and targets.

This should include:

1. Establishing a long-term carbon sink through a comprehensive national programme to incentivise the reversion and planting of new native forests to maintain net zero long-lived greenhouse gas emissions beyond 2050.
2. Designing a package of policies to reduce reliance on forestry removals and manage the impacts of afforestation including:
    a. Amendments to the NZ ETS to manage the amount of exotic forest planting driven by the scheme (see also Recommendation 11 on the NZ ETS).
    b. A clear position on the role and desirability of different types of permanent exotic forests as carbon sinks, and amending the NZ ETS and other policies accordingly.
    c. Land-use planning, direction and tools to help local government manage afforestation, mitigate localised impacts of afforestation and to achieve environmental co-benefits.
3. Managing pests in an integrated way, to ensure forests are successfully established and all forests are maintained long term.
4. Considering ways to allow more flexibility for Māori-collectives with pre-1990 forest on their whenua, to give them more scope to manage their whenua in alignment with the intergenerational aspirations of their members. This could include, for example, assisting capital-constrained Māori-collectives to offset deforestation on pre-1990 forest land.
5. Maintaining and increasing other carbon stocks through:
    a. Improving and enforcing measures to reduce deforestation of pre-1990 native forests.
    b. Noting that emissions and carbon dioxide removals may not currently be reliably quantifiable or accounted for in targets (see Recommendation 5 on rules for measuring progress), taking steps to:
        i. Protect and increase the carbon stocks of pre-1990 forests through activities such as pest and fire control, and enrichment planting.
        ii. Encourage carbon removals by new and additional small blocks of trees and vegetation.
        iii. Preventing further loss of carbon from organic soils, particularly due to the degradation of drained peatlands and the destruction of wetlands.

Recommendation 25

Provisional progress indicators

1. Government to have, by 31 December 2022, developed proposals for incentives for native forests and for managing the amount of exotic forest planting driven by the NZ ETS, with amendments to be effective by 31 December 2024.
2. Government to report, from 31 December 2022, on the hectares of exotic and native forest that are afforested and deforested at least annually.
3. Government to report at least annually, from 31 December 2022, on a suite of indicators including information on labour, nurseries, land purchases, pest eradication data (area to which 1080 has been applied or farm management plans).

Assessment of our recommendations against our policy approach

Recommendation 25	Action to address barriers	Pricing to influence investment & choices	Enable innovation & system transformation
Manage forests to provide a long-term carbon sink			
Develop a national programme to incentivise the reversion and planting of new native forests	✓	✓	✓
Design a package of policies to reduce reliance on forestry removals and manage impacts of afforestation	✓	✓	
Manage pests in an integrated way	✓		✓
Consider ways to allow more flexibility for Māori-collectives with pre-1990 forests on their whenua	✓	✓	
Maintain and increase other carbon stocks	✓	✓	